Adopt a Stream

SHORELINE SURVEY

A STREAM TEAM MONITORING PROJECT

LEADERS' MANUAL

Fourth Edition, May 1996

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Riverways Programs

May 1996

Dear Shoreline Survey Stream Team,

Congratulations on becoming part of a Stream Team in your watershed! As you participate in Shoreline Surveys, you will look for the vital signs of the river. With experience, your group learns to read a river, from human eyes, and from the eyes of wildlife and on behalf of the river itself. You will learn what the river needs to be healthy, and you will learn how to spot threats to the river. The river is a reflection of the adjacent land use and surrounding watershed.

The Survey, designed to be conducted by lay people, provides information about the current conditions of your river and its corridor. By filling in data sheets and maps and by taking photographs, you will be creating baseline data for your river. This information will alert your group, your town, and state agencies to problems on your river, to the existence of valuable resources, and to potential access, trail and recreational resources. Groups can use the data to help protect rivers from continued pollution from pipes and runoff, prevent destruction of habitat and siltation of fish spawning areas, and protect adequate flows for the river.

The completion of a Shoreline Survey allows your group to prioritize your findings and create an action plan based on field observations of the river. Using techniques from this manual, you can determine which problems require immediate action, and you can create long term action plans for your river. These plans and suggestions can be included in your town's Master and Open Space Plans and can influence town boards' daily decision making. You can share the information with EOEA State Agencies involved in watershed based studies. Data from Shoreline Surveys can be used as documentation when you apply for grants.

Shoreline Surveys are an important tool for river and watershed protection. What happens upstream affects downstream, and what happens on the tributaries affects the mainstem. We urge you to expand your survey work into an action plan and a stewardship program for your stream (brook or river). Once several subwatersheds have made plans, these can be connected to form an action plan for the watershed.

You may first want to skim the Table of Contents, the List of Figures and the text. You can then concentrate on the sections as you need them. This manual, a leader's guide to Shoreline Surveys, is a compilation of information gained from working with groups across the Commonwealth. Your group needs to pick and chose and substitute what will work on your stream. As we learn from you and other groups, we will update this information. Accompanying this manual is the Hop Brook Case Study which summarizes the highlights of a Shoreline Survey. You may wish to photocopy this for your Shoreline Surveyor volunteers.

We invite you to become a member of the **Adopt-A-Stream Program** and join the many other active stewardship groups working on behalf of their favorite brook or river (see Appendix J). For groups who are members of the Program or who wish to join, please call us to see if we can schedule a training session and follow-up sessions for your group or your region. We must plan in advance for these sessions since we cover the entire state. For all groups, we are always available for phone consultations and to provide materials and networking opportunities with other groups and state agencies.

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Maria Van Dusen, Riverways Coordinator
Karen Pelto, Stream Ecologist
Russell Cohen, Rivers Advocate

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Figure 1 A **STEPS TO CREATING AN ADOPT-A-STREAM ACTION TEAM ON YOUR RIVER**
With staff assistance & materials from Adopt-A-Stream/Riverways Programs

Begin

People, concerned about a river, brook (streams) or adjacent lands contact the Adopt-A-Stream Program or Watershed Association. (Abutters, town officials, canoeists, anglers, civic organizations, business groups, school monitoring programs.)

Preliminary meeting:
- discuss concerns and record local observations
- present Adopt-A-Stream approach
- decide to do a Shoreline Survey

Gather Data

Shoreline Survey:
- Training session
- Shoreline Survey field work
- Data reporting meeting

Create Action Plan

Management Plan: from Shoreline Survey data, determine key short and long term actions.
Actions to protect
- water quality
- water quantity
- land adjacent to stream
  - (protect greenways)
  - (promote good stewardship
  - (create trails and access)
- habitat

Formalize Group

If group has not yet joined the Adopt-A-Stream Program, now is the time to do so. Group agrees to provide stewardship to river or brook by implementing its action plan. Group finalizes a mission statement with goals clarified. (See Appendix I.)

Take Action

Action: Group carries out short and long term action plans and creates a time line. As group progresses, and responsibilities are divided up, group continues to refer to mission statement and revises action plan and time line. During this time, alliances continue to be made with town, state and federal agencies, civic groups, and individuals.

Introduction to the Shoreline Survey

The Adopt-A-Stream Program of the Massachusetts Department of Fisheries, Wildlife, & Environmental Law Enforcement has developed the Stream Team Approach to river watching in response to local concerns for the health of rivers and river resources. Residents of various towns have called and asked us to help them follow up on abused areas adjacent to the river. Reports include dumped tires, fish kills, accumulation of litter and debris, discolored water near landfills and gravel pits, runoff from parking lots and sediment from bridges. People are concerned about possible pollution in rivers, and they want to help.

What is the purpose of Shoreline Surveys?

The overall purpose of a Shoreline Survey is learn about the river in order to protect it. Through the Survey, you will be able to determine some of the vital signs of a river, report immediate problems to proper authorities, and prioritize both short term and long range work that needs to be done.

Objectives of Shoreline Surveys include gathering baseline data, designing a water quality monitoring program, finding causes of high coliform counts, tracking polluted runoff, protecting land, protecting or restoring habitat and promoting citizen awareness. Each group must decide which objectives best serve the river.

How do you do a Shoreline Survey?

Groups divide the river into reasonably sized segments and walk or canoe each segment. The choice of walking or canoeing often depends upon the conditions on the river. Some river banks are impenetrable because of vegetation or inaccessible because of unsafe conditions, or concerns of the owner. When a river is suitable for canoeing, groups can avoid requesting landowner permission to cross private property, but they still should invite the landowners to join them as part of an important constituency-building process. If neither walking the shores nor canoeing is possible, groups must rely on bridge crossings and views from roads.

Volunteers in pairs, or, in canoes, in threes with a non-paddling note taker, write their observations on the data sheets, take photographs, and identify key areas on their maps. This Shoreline Survey guide contains data sheets which you can use or modify to fit your river. In addition, this guide consists of instructions, samples of work, descriptions and photographs of what you will see, and background information.

When should you do a Shoreline Survey?

Shoreline Surveys can be done any time in your river protection work. Some groups conduct them as they first begin their work and use it as a planning tool; others, at midpoint, to pinpoint sources of pollutants or to gauge success of clean ups or restoration projects, and some conduct them regularly to see seasonal and yearly differences. Although you can do Shoreline Surveys at any time of year, there are advantages and disadvantages to each season. Groups may choose to do surveys at times of low water, in late summer, when some problems are more evident; or in late fall or early spring when vegetation does not obscure the bank. In the spring or fall, groups should avoid walking on the stream bed because fish may be spawning.

What can you do with the data from a Shoreline Survey?

Both the detailed questions on the data sheets and the summary sheets can be the basis of a report on the health of the river which you can put together to share with the public and local officials. From follow up sessions, groups create priority action items and an action plan. The Shoreline Survey manual describes how to create priority lists, an action plan, and suggests follow-up actions you can take.

SECTION I

PREPARING FOR THE SHORELINE SURVEY

Section I. Preparing for a Shoreline Survey

Shoreline Surveys are more effective if your group has thought about how the survey will serve your purposes in working to protect your river. Volunteers feel more empowered if they know how the data will be used and that their work will help the river.

A. Setting Goals:

As your group plans a Shoreline Survey, you all need to think about

1) why you are doing a Shoreline Survey
2) what you plan to achieve
3) what you will do with the data you collect.

Why? Clearly specify and WRITE DOWN the reasons for conducting a Shoreline Survey. For example, your group may want to:

--build an informed constituency for stream protection
--collect baseline data to promote better local and state planning for stream protection & restoration
--determine the impact of point and non-point pollution
--identify habitat
--discover potential access points and trails
--identify lands suitable for protection
--determine the impact of new development along the river
--assess the effectiveness of specific clean up efforts
--promote understanding of watershed issues
--identify wetlands suitable for restoration.

What do you plan to achieve? Clearly specify and WRITE DOWN the outcomes that the program is designed to achieve. For example, you may want to:

--educate public officials & local residents & businesses
--restore the quality of the stream for specific recreational and natural purposes
--stop inappropriate development and work with town officials to ensure that proper siting and buffering occurs with new developments
--protect fish & wildlife using the stream
--identify effective cleanup strategies
--assess water quality of stream areas used for water supply, recreation, or by sensitive aquatic species
--locate good fisheries habitat & stream restoration sites.

What are you going to do with the data you collect? Consider some specific actions. For example:

--create a report on the status of the river, share it with your members and town officials and publish a summary of it in the newspaper
--design a water quality monitoring program
--alert environmental officials to potential pollution violations
--submit data for inclusion in a statewide stream monitoring database (to be developed)
--protect and restore aquatic habitat
--share information with DEP (see Appendix H for information about their permitting and testing schedule) and other state and regional agencies to enhance their planning and protection strategies for your watershed and stream.

B. Recruiting Volunteers and Sharing the Work

The Shoreline Surveys provide people with an opportunity to be out on the river or river banks, to learn about the river, and to contribute to its protection. Some groups advertise a meeting in the newspaper or in their newsletters; others call prospective volunteers on the phone. You may be surprised at the number and range of volunteers you hear from; people volunteer to do Shoreline Surveys who would never go to an indoor meeting. Regardless of your recruitment methods, be sure that town residents and riverfront landowners feel included.

You do not need vast numbers of volunteers. Estimate the number of volunteers needed by dividing your river frontage into reasonable segments (a half a mile, a fourth of a mile--depending upon the river). Each segment requires at least two people. To determine reasonable lengths of each segment, consider how difficult the river is to walk or canoe and how many pipes or other factors need to be observed. In addition to surveyors, you will need people to coordinate the Shoreline Survey.

Some groups have created a steering committee to run the Shoreline Survey. This committee can be comprised of a few key people who are doers. Other groups have organized by dividing the river into large stretches and appointing team leaders for each stretch to divide up the work, gather maps, inform landowners and recruit volunteers for their sections. Volunteers can be asked to bring friends. Invite members of town boards, the League of Women Voters, garden clubs, anglers and sportsmen, canoeists, business clubs, local businesses, high school groups and land trusts.

We recommend that each task have two people (or more) to share the workload. Some of these tasks may need a committee of several people. By involving several people, each task is more fun and is less likely to result in volunteer burnout. Tasks for a Shoreline Survey generally include:

- Overall Coordination: Oversee the project from beginning to end and to make sure that all the steps are taken.

- Volunteer Coordination: Invite people to participate in the survey and make sure they know when to meet and what to do.

- Public Relations Coordination: Write and distribute letters to landowners, write press releases and articles in your newsletter, invite town officials, cable TV, radio, and other organizations to training session, etc., and prepare follow up publicity.

- Materials Coordination: Create baseline maps, see that handouts and maps are photocopied, and organize canoes if necessary.

- Follow up Coordination: Work to get a summary report written, review the summaries and data sheets, make a base map to accompany the report and support action planning and steps to action including working with town boards.

C. Creating the Maps

You will want to make a base map for the length of river which will be used for your training workshop, for follow up sessions and for public displays. You will also want to divide up the base map into segments which can be surveyed in the field by pairs of volunteers. The lengths depend upon access to the site, complications of the shorelines (heavily developed ones will take longer), and stamina of the volunteers. As you create the segments consider whether you will be using canoes or walking the shore.

We suggest that each reach of shoreline be a section with fairly homogenous characteristics of about 1/2 mile. Less or more is entirely appropriate. It will be easier for future stream teams to locate your sites if the section is bounded by clear landmarks (roads, bridges and tributaries). Once you divide up the baseline map into segments, make two photocopies of each segment. One copy for volunteers to use in the field and one copy to be photocopied for later surveys. People appreciate having a small map of the entire segment on the back of their segment map. The segment map needs to be large enough to locate pipes, erosion, access points, etc.

There are several types of maps you can use. Whichever map you choose, it should be "user friendly." People must be able to use them to know exactly where they are. Make a trial visit to the river with the map. Can you find your location with ease? We have included a description of some of the more easily available maps.

Topographic maps: USGS Quadrangle (quad) maps

To obtain information about your Shoreline Survey area, find a USGS topographical (topo) map of your area. The "topo" maps are excellent in that they show buildings, elevations, waterways and roads. We recommend a 7 1/2 minute quad map (a 1:24,000 map where 11 inches = 4 miles). They are available at local sporting goods stores. For some rivers and brooks, you will need to purchase and tape together several topo maps in order to show the entire stretch of your river that you plan to survey.

Although the maps are detailed and show many important features, their scale is too small for volunteers to use in the field. By enlarging (200% to a scale of 1" = 1000 feet) on a copy machine, you will have a map that is easier to read and manage. When you photocopy and enlarge the map, be sure the enlarge the scale bar by the same percentage so that the scale bar is accurate. (See *Figure 1A* for an example of a 200% enlarged topo map.) The enlarged map is good to use as your base map. Take a copy of the map, divide it into river segment and provide a river segment map for each team. [Note: Some groups use a mylar sheet over the base map to show findings from the Shoreline Survey. By using mylars, you will protect your base map and still be able to show what surveyors found.]

Town and City Maps

Groups have also used zoning maps and assessors maps successfully. For a fee, town halls will often copy maps for you or allow you to make copies. (See *Figure 1B* for an example of an Assessors' map.) These are detailed enough to allow people to mark sites on the map. The Hop Brook Protection Association worked with town officials as they planned their Shoreline Survey. Realizing that the Survey benefitted the town as well as the brook, the Conservation Commission allowed the group to photocopy the appropriate assessor maps. Other towns have also donated copies of the map or photocopying privileges. Again tape the maps together to make a large base map. Copy this map and cut it into segments for each team.

Sketch maps

Topo maps or city maps can also be used as a template to trace in making an accurate sketch map of your stream segment. A marked copy of your sketch map and data sheets will make follow up easier. They can be used to identify exact locations in the field and for entering your data into a data management system. Sketch maps of each section on an 8.5 X 11 inch pieces of paper. This map will be used in the field to identify locations of possible problem areas, resource areas, and photographed areas along the stream or shore. Be generous with space; fill up most of the page. Add several landmarks to your map. (See *Figure 1C* for an outstanding example of a sketch map showing sites in a busy urban section.) Use several of the same landmarks as are shown on a USGS map. Add a North Arrow and a scale bar to indicate the scale. You can either print comments or use numbers with a corresponding key to identify sites. (See Figure 7, data sheets for suggestions.) Save one copy of each sketch map for photocopying for later surveys.

(*Text continues on page 14*)

Figure 1.B **Enlarged U.S.G.S. Topographic Map.** Map has been enlarged 200%. This map was used by the Pokanoket Watershed Alliance on a Pipe Survey. Note numbers which indicate location of pipes. Note that the scale of the map must be enlarged at 200% also.

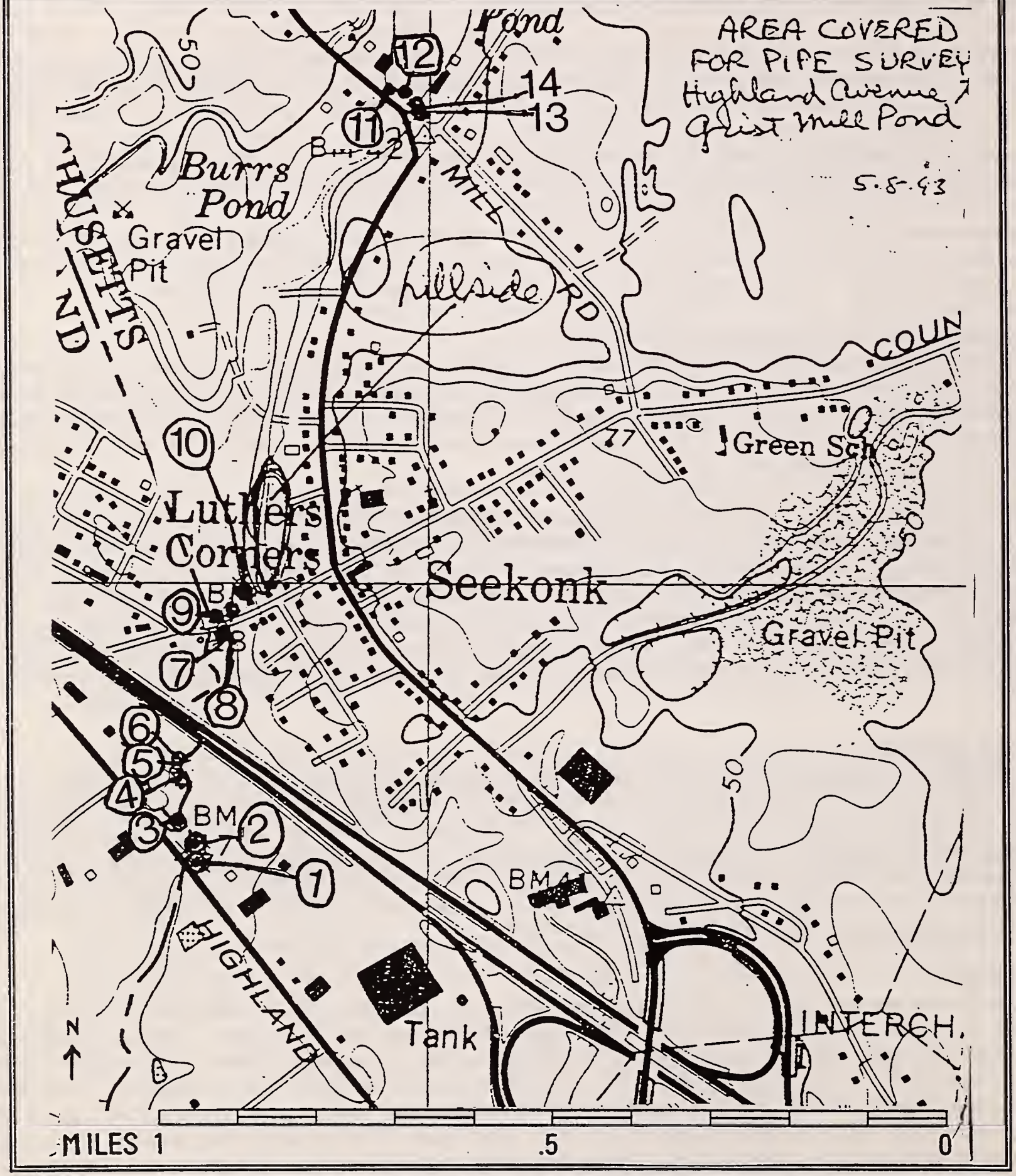


Figure 1B. **Assessors' Map**. These maps can be obtained from City or Town Hall. By working with town officials, some groups, such as the Hop Brook Protection Association, have been able to photocopy these maps. Other groups have paid to copy the Assessors' maps. . Sample map is part of one used by a Shoreline Surveyor on Section 9 of Hop Brook. Although this map, at a scale of 1" = 200', does not have contour lines, people are able to orient themselves on the river by finding property lines and city streets.

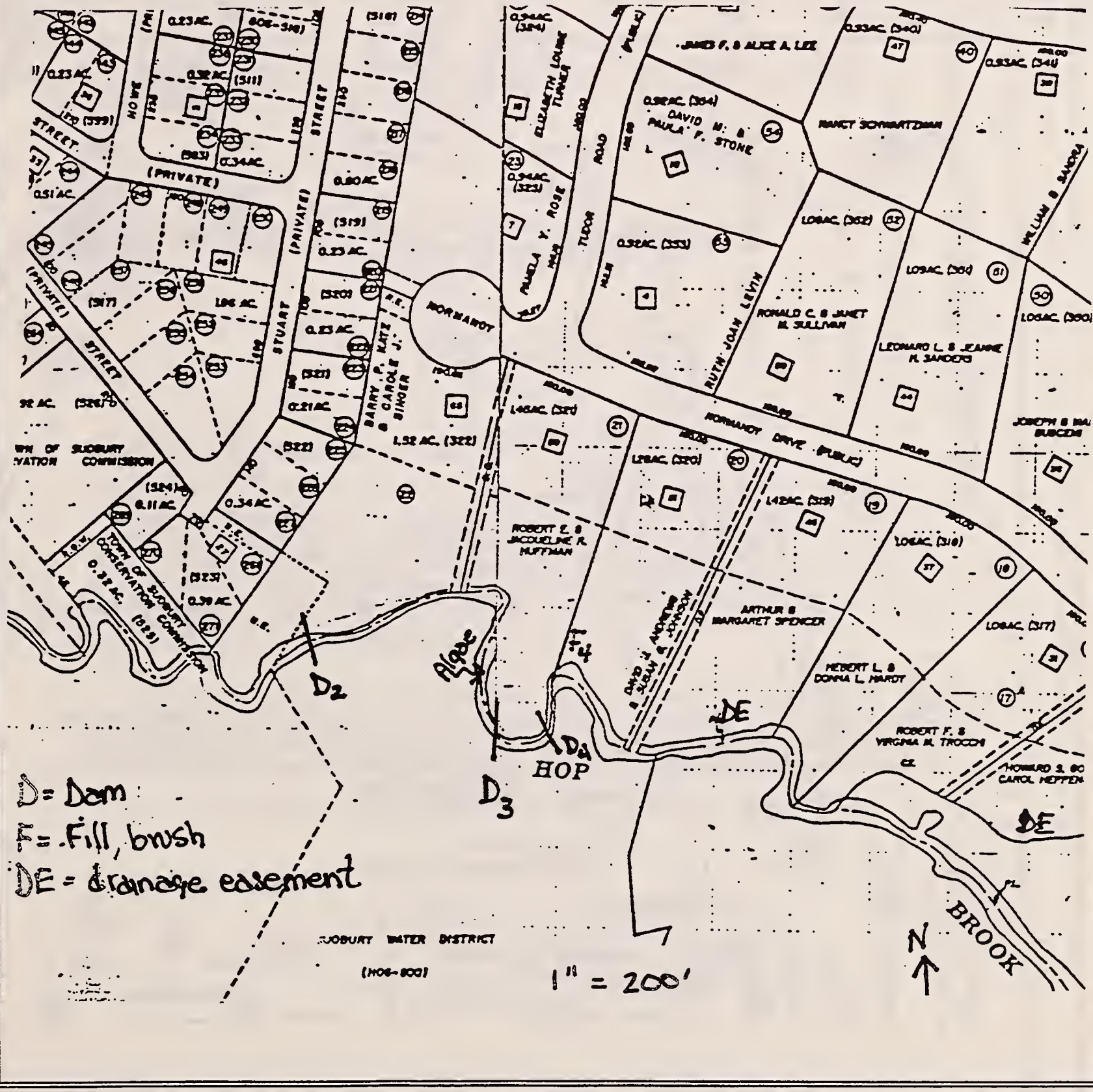
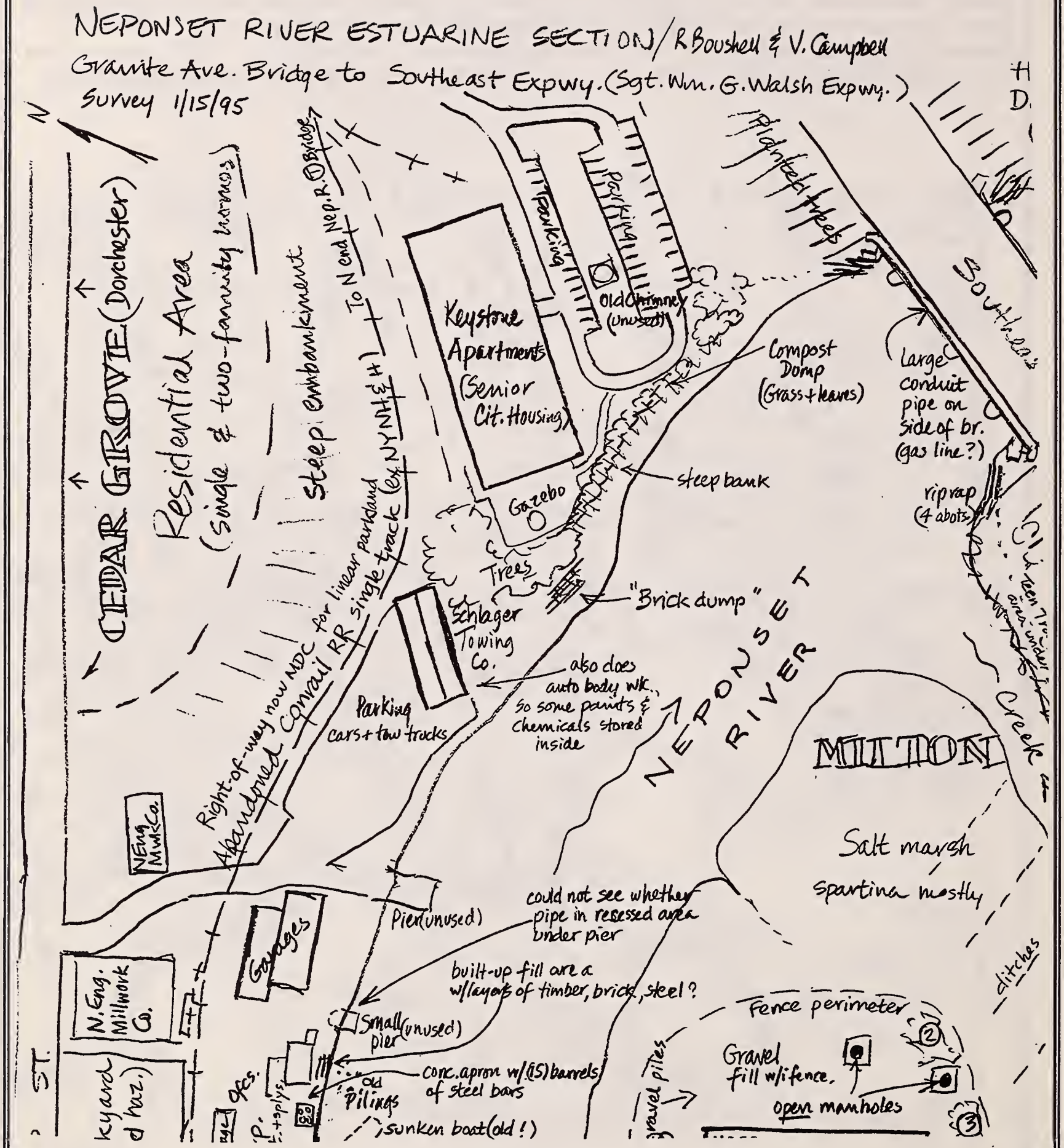


Figure 1C. **SKETCH MAP.** This sketch map (only a portion is shown here) was created by Vic Campbell for the Neponset River Estuary Survey (1995). It shows excellent detail of this busy urban area.



D. Including Landowners and the Public

It is essential to work with landowners along the river. Involving them in the Shoreline Survey is an excellent way to enlist their support in the work and in the follow up. At the very minimum, you must notify them if you will be crossing private property. Some groups have found that it is possible to do Shoreline Surveys by canoe, others have walked along shorelines, and others have just been able to do the surveying from roads and bridges. Some groups have asked a member who owns land along the river to write other landowners; depending upon the size of the river, members have knocked on doors and left fliers in the mailboxes; others have mailed letters. (For sample letters, see *Figure 2 A,B,C.*)

Groups have found press releases to be a good way to alert residents about Shoreline Surveys. This is a way to involve prospective members and it makes follow up easier. (For a sample newsletter article, see Figure 4.)

(Text continues on page 19.)

***Figure 2A.* SAMPLE LETTER TO RIVER RESIDENT** (Westport River Watershed Alliance)

WESTPORT RIVER WATERSHED ALLIANCE
1151 MAIN ROAD, P.O. BOX 3103 WESTPORT, MASSACHUSETTS 02790

September 10, 1990

Dear River Resident,

WRWA invites you to participate in our new River Watch Program. We are asking waterfront area residents to join together to monitor the river for pollution or unusual changes and report their findings to WRWA. The Westport River is a precious resource, but increased development, boat traffic, and recreation may threaten the qualities of the river that make it so attractive. If all of us play an active role in monitoring the river today, it will stand a better chance of remaining clean and unspoiled in the future.

To join a River Watch Stream Team, come to an organizational meeting on Wednesday, September 19th, at 7:30 P.M., at the WRWA office, 1151 Main Road. Maria Van Dusen of the Massachusetts Riverways Program will be joining us to discuss the nuts & bolts of this program.

If you wish further information, please call the WRWA office at 636-3016.

Sincerely,

Elizabeth A. McEvoy
Administrator

Figure 2B. **SAMPLE LETTER TO RIVERFRONT LANDOWNERS** (Pokanoket Watershed Association)

January 23, 1992

Dear Neighbor of the Runnins River,

The Runnins River Task Force and Citizens from its three watershed communities, Seekonk, East Providence and Barrington, have joined together in an interstate effort aimed at protecting and restoring the Runnins River. As a landowner along the Runnins, we invite you to join us in our efforts and participate in a visual survey of the river.

Volunteers from the three towns have agreed to monitor and asses the condition of the Runnins River and, as the first step, the volunteers will soon be participating in a visual Shoreline Survey of the river and its tributaries. To accomplish this survey, the volunteers will access the river via road crossings and then either walk or canoe down the river, observing and recording important instream and streamside characteristics. Care will be taken not to traverse any private property, but it may be necessary to walk along the river's banks in certain areas.

If you have any questions or concerns about this Shoreline Survey program, please contact me at 433-2351, or Bob Ballou, the Citizen Monitoring Coordinator for the Rhode Island Department of Environmental Management at 277-6519. If you would like to participate in this visual survey, there are still sections of the river that have not been assigned to volunteers.

Thank you for your time, and we hope to work with you in the future.

Sincerely,

Conservation Commission Chair
Runnins River Task

Figure 2C. **SAMPLE LETTER TO RIVERFRONT LANDOWNERS** (Neponset River Watershed Association)

NEPONSET RIVER WATERSHED ASSOCIATION

The Bradley Reservation, 2468A Washington Street
Canton, Massachusetts 02021 (617) 575-0354

April 28, 1995

Dear Neighbor of Pine Tree Brook,

You may have read in one of the local papers this week that the Neponset River Watershed Association and citizens from Milton have combined efforts to protect and restore Pine Tree Brook. As a landowner along the brook, we invite you to join us in our efforts and participate in a visual survey to determine possible sources of pollution to the brook.

Volunteers from your community have agreed to monitor and assess the conditions of Pine Tree Brook and, as a first step, the volunteers will be participating from May 6 until May 24th in a visual Shoreline Survey of the brook as it flows to the Neponset River. To accomplish this survey, volunteers will access the water via nearby roads and then either walk or canoe down the brook, observing and recording important instream and land use characteristics. Care will be taken not to traverse any private property, but it may be necessary to walk along the river's banks in certain areas to avoid tramping wetland habitat.

If you have any questions or concerns regarding this Shoreline Survey Program, please contact me at 575-0354. To participate in the Shoreline Survey or become part of this effort, please join us at our next meeting **May 24th from 7 to 9 pm in the Milton Public Library.**

Thank you for your time, and we hope to work with you in the future.

Sincerely,

Andrew W. Gregg
Project Coordinator

Boston, Canton, Dedham, Dover, Foxboro, Medfield, Milton, Norwood, Quincy, Randolph, Sharon, Stoughton, Walpole, Westwood

Figure 3. **SAMPLE NEWSPAPER ARTICLE.** (Hop Brook Protection Association)

Hop Brook Protection Association

P.O. Box 707
Sudbury, MA 01776

October 10,1994

For: Immediate Release
Contact: Ursula Lyons 000-0000
or Karen and Ron Riggert 000-0000

Shoreline Survey to be conducted

Hop Brook Protection Association looking for help

There will be a training Session on Thursday, November 10 at the Fairbank Senior Center from 7:30 to 9:30 p.m. for anyone interested in helping the Hop Brook Protection Association (HBPA) conduct a Shoreline Survey of the Hop Brook ponds and streams in Sudbury.

Hop Brook is a 9.4-mile system of ponds and streams which flow from the Marlboro Easterly Wastewater Treatment Plant to the Sudbury River. Joan Kimball from the Massachusetts Department of Fisheries, Wildlife and Law Enforcement's Riverways Programs and coordinator for the Adopt-A-Stream Program, will lead the training session. She will present slides and explain how to use data sheets, maps and cameras.

According to Kimball, "Shoreline Surveys have many benefits. We have learned that they increase the awareness of everyone - citizens, businesses and town boards - about the conditions and needs of local rivers. By locating problem pipes, or discovering trash, groups can work within the community to improve rivers and brooks. By identifying habitat and locating potential access areas, people have protected these areas."

Following the training session, participants will work in small teams along segments of the Hop Brook, conducting their surveys whenever possible before the first major snowfall. Neighbors are invited to form their own teams and work within a nearby area.

Frank Lyons, President of the Hop Brook Protection Association which joined the Adopt-A-Stream Program in 1992, said "Although the association's main goal is to stop the point source pollution from the Marlboro Easterly Wastewater Treatment Plant, we also want to prevent any further pollution to Hop Brook from nonpoint sources. The Shoreline Survey will help to determine any nonpoint source problems and to curtail them.

No experience is necessary to participate in this grass roots project, For more information call HBPA members Ron or Karen Riggert at 000-0000.

-30-

Printed on PAGE 14 • THE SUDBURY TOWN CRIER and FENCE VIEWER • October 17, 1994

Figure 4. **SAMPLE NEWSLETTER ARTICLE** (Westport River Watershed Alliance--WRWA)

The Westport River Watershed Alliance

River News

NEW STREAM TEAMS MONITOR THE RIVER

River-watchers have united to help protect the environment in the Westport River watershed. A meeting at the WRWA office on September 19th resulted in more than two dozen volunteers joining "stream teams" to monitor and report on prospective problems increased steadily. "Last spring we had a call about tires being buried illegally," said Administrator Betsy McEvoy. "We called the police and the Board of Health, who acted promptly and had the violators remove the tires. More recently, someone saw brush being dumped into the river. The Conservation Commission went to the site, took photos, contacted the responsible party, and had the problem corrected." Reports have ranged from propane tanks washing ashore to human waste floating in the river.

The Volunteers will draw maps of their areas, identifying natural as well as man-made structures like ponds, forests, culverts, and docks. Two close inspections a year will produce data on quality of habitats, signs of wildlife, water color, and vegetation. Following each inspection, each stream team will watch for any changes such as clearing land for development,soil erosion, heavy salt use on roads, any form of pollution and litter. The record will also note man-made structures in need of repair or replacement, like culverts and drainage ditches, or hay bales intended to catch soil from cleared land.

All changes seen and reports made will be accompanied by a written report and forwarded to the appropriate authorities. Signs reading "River Watch Area -- KEEP IT CLEAN" will be posted in every team's area or along the shore to promote awareness of our fragile environment.

For more information on the River Watch Program, or to join a Stream Team, please contact the Westport River Watershed Alliance at 508-636-3016, or stop by the office at 1151 Main Road, Westport.

E. Conducting a Training Session

Volunteers planning to do a Shoreline Survey should attend a training session either prior to the survey or in the field on the day of the survey. It is imperative that volunteers know what they are looking for and the reasons for the Survey. If you are a member or prospective member of the Adopt-A-Stream Program, arrange for Adopt-A-Stream Program staff to present their slide show to help people identify problems and learn what to look for. Each pair of volunteers will need a map of their section of the river and data sheets. Discuss how to orient volunteers to the map in the field.

Groups find it effective to have people talk about the river beforehand. If each person says either why they have come to the meeting or what his or her concern is, you will gather important information about the volunteers and you will learn more about the river and the individual segments.

Involving town officials from the beginning is an excellent strategy for river protection. In Sudbury, the Hop Brook Protection Association invited the Conservation Commission and Conservation Officer to help plan for the survey and participate in the training session and follow up meetings. The group received background information and maps from the Commission. In return, the town gained a field inventory, a description of the condition of all the pipes entering the brook, and volunteers and constituents who will work for the town.

Based on your reasons for doing a Shoreline Survey (see page 8) and the conditions of your river or brook, choose which survey to conduct or which to conduct first. The three surveys in this manual are (a) the Basic Survey and Summary Sheets (*Figure 7*), (b) the Pipe Survey (*Figure 8*), and (c) the Bridge Survey (*Figure 9*).

Figure 5. **SAMPLE AGENDA FOR TRAINING SESSION FOR STREAM TEAMS**

Introduction
1. Introduce the Shoreline Survey, its purposes and how it will be used in follow up actions.
2. Ask volunteers to say a sentence about what river means to them or concerns they have.

Shoreline Survey Goals
3. Agree on <u>your</u> goals and objectives for doing a Shoreline Survey. Make sure that people understand what will happen: Shoreline Survey, follow up session, action planning session, time frame, action.

Data Sheets
4. Review the Data Sheets: explain the purposes of each.

If you have slides of the river, or can arrange with Adopt-A-Stream staff to bring their slides, you can use them as training. The Adopt-A-Stream slide show follows the format of the questions on the basic data sheets so people feel comfortable using the data sheets. An alternative method, instead of using slides, is to use a spot on the river as a living classroom.

Maps
5. Using your base map, show people the sections which will be surveyed. If you have not created teams for each section, ask for a team of 2-3 volunteers for each section.

Shoreline Survey Field Kits
6. Make sure that each team has a data sheet and map for their section, knows what they will do during the survey, and know what to do with the data sheets after the survey.

Safety
7. Discuss *Stream Team Tips for Shoreline Surveys* with the volunteers. (For ideas, see *Figure 6.*)

Follow-up Meeting
8. Plan a follow up meeting to record observations.

Figure 6. **STREAM TEAM TIPS FOR SHORELINE SURVEY**

When you are ready to begin your walk to record baseline data, keep in mind the following precautionary tips:

- Always work with someone
- Do not put yourself in danger to gather survey information. The stream bed can be very slippery and uneven, sometimes at unpredictable times and places.
- Be careful of ticks, poison ivy, nettles, insects. Bring repellent. Wear long pants and boots.
- Consider landowners' rights. Get the permission of landowners to cross any private land, posted or not. Do not enter any posted areas without permission. Take advantage of any public access points.
- Watch out for irate dogs. Walk cautiously and practice good dog etiquette.
- The water is not potable; do not drink it.
- Do not walk on unstable banks; your footsteps could speed erosion.
- Be alert for spawning areas and shellfish beds. Do not disturb or walk on them.
- Do not attempt to walk across streams that are swift and above the knee in depth. These can be dangerous.
- Life preservers are required by law for everyone in canoes
- **IF FOR ANY REASON YOU FEEL UNCOMFORTABLE ABOUT THE STREAM CONDITIONS OR SURROUNDINGS, PLEASE STOP YOUR SHORELINE SURVEY. YOU AND YOUR SAFETY ARE MUCH MORE VALUABLE THAN ANY OF THE OBJECTIVES OF THE SHORELINE SURVEY.**

The following is a list of items to have along on your Shoreline Survey.
Recommended:

- Shoreline Survey Data Forms
- Map of the section your team is surveying (and possibly small scale map of entire section for reference)
- Clip board (with waterproof cover or zip lock bag)
- Two pencils (preferably mechanical)
- Camera and film
- Copy of letter to landowners sent out by your group
- Paper identifying you as Shoreline Surveyor
- A buddy
- Gloves

Optional:

- Comfortable rubber boots
- Snag and thorn-proof clothing
- Folding ruler
- Compass
- Binoculars for bird identification

SECTION II

GATHERING AND PRESENTING DATA FOR A SHORELINE SURVEY

Section II. Gathering and Presenting Data for a Shoreline Survey

A. Using the Basic Survey for Gathering Data:

This section will help volunteers understand the intent behind questions on the data sheet. Feel free to change the questions and the format to lead to best protection for your river. In this section, the Data Sheets are on the right hand pages (Figure 7) and the explanations are on the left hand pages.

I. Instream Conditions

These questions will help you determine the health of the stream bed and its water.

A. STREAM BOTTOM:

1-2 **Composition and Color**: Composition can indicate the health of the stream for habitat. Depending upon species, fish need different bottom substrate--from gravel to firm sandy bottoms. Rivers bottoms have different characteristics depending upon their geology. Rivers with a higher gradient (steeper slopes) will have a number of larger sized rocks; flat meandering rivers will have finer grained bottom material. Sand is an important indicator. In many cases, sand occurs naturally; however, much of the sand in our river is sediment from construction runoff and road runoff. Sand and silt smothers fish spawning areas, fills pools and binds toxics and poisons. Excessive amounts of sediment should be noted on the map and in your summary. Orange to red stains results from bacterial action upon iron and may indicate erosion or industrial pollution. Note the color you see.

B. WATER:

1-3. **Color and Odor:** Healthy streams can be clear or they can be brownish (tea color) due to tannic acid from wetlands. A muddy or cloudy stream can indicate sediment or total suspended solids from a wastewater treatment plant or polluted stormwater runoff. Milky sections, often accompanied by sewage-odor, a musky or rotten egg smell, indicate an illegal hookup or a leaking septic system, a major source of *nonpoint source pollution*. Oily sheen can indicate either natural decay of organic material along marshes or polluted runoff from roads and parking lots; another form of *nonpoint source pollution*. If the sheen is extensive and appears to be a spill, report it to the Fire Department or Board of Health. Foam can be naturally occuring and can be identified by its brownish color and because it breaks up easily. Foam from non-natural causes (human overuse of phosphates from wastewater treatment plants or from activities such as car washing) is very white or bluish and does not break up easily. Fishy smells may indicate that there has been a fish kill.

4-6. **Flow**: It is important to correlate the flow of the river to different seasons, or to changing but natural conditions such as rainfall or drought conditions. In contrast, some river levels vary and may be lower because of withdrawals and diversions. By keeping a record, you will get to know seasonal changes and unusual conditions. You will have important information to share with officials when the new Water Management permits for water withdrawals are made. Under the Water Management Act, the DEP issues permits for withdrawals of over 100,000 gallons per day for uses such as public water supply wells, agriculture (irrigation), and business needs.

7-8. **Pools, riffles and snags:** These are important for fish because they provide habitat, resting areas, feeding areas and cover.

C. VEGETATION

1-2. **Excessive vegetation:** Excessive numbers of plants or algae in the water indicate excess nutrients from human actions. This too indicates *nonpoint source pollution.* Areas of excessive vegetation should be marked on the map and noted in your summary section under water quality.

3. Wetlands. Healthy wetlands are free of invasive plants such as phragmites and purple loosestrife, do not contain fill, do not have ditches draining the water, do not have pipes discharging material, and are not filled with trash. If you have wetlands in your section please note whether you consider them healthy or not. If degraded, please circle the reasons that they are degraded. If you have a large amount of degraded wetlands, you may want to conduct a Wetlands Survey (see page 31 and Appendix D Wetlands Primer) and work with your Conservation Commission and/or the Wetlands Banking and Restoration Program.

Figure 7.

SHORELINE SURVEY FIELD DATA SHEET

Segment begins:_____
Segment ends:_____

Observers:_____Date:_____
Today's weather:_____
Weather over past 24 hours:_____

I. Instream Conditions:

A. Stream bottom:

1. What is stream bed made of?
   Mark from 1 (most typical) to 6 (least typical)
   _____Organic debris (leaves, twigs) _____Gravel (1/4 - 2")
   _____Silt (mud) _____Cobbles (2 - 10")
   _____Sand (1/16 to 1/4") _____Boulders (> 10")

2. What color is the stream bottom? *(Circle One)*
   Black Brown Orange/Red Yellow Sandy Gray Other_____

B. Water

1. What Color is the water? *(Circle One)*
   Clear Cloudy Tea Milky Muddy Other_____

2. Are there indications of... *(Circle)* Oily sheen Foam Scum Other_____
   *Describe cause if obvious*_____

3. What is the water odor? *(Circle One)*
   No odor Rotten eggs Musky Fishy Oily Ammonia Other_____

4. How deep is the water? *(Circle)* < = less than; > = greater than
   < 1' > 1' > 2' > 3'

5. In your opinion, is the water level *(circle)* **higher** or **lower** than usual for this time of year?
   If problem is severe state why. _____

6. Is the water flowing..... *(Circle One)*
   Quickly Slightly Almost still

7. Number of pools _____ Number of riffles _____ Don't know _____

8. Is the stream flow blocked by *(circle)* **trees**, **trash**, or **man-made objects**? **If yes locate on map.*

C. Stream vegetation

1. Are there areas of extremely dense or clogging aquatic vegetation in any section?
   (Circle one) **Yes** or **No** **If yes locate on map*
   *Describe cause if obvious.*_____

2. Are there areas on the stream bed or around pipes that are algae covered? _____
   **If algae seems abnormally heavy locate on map.*

3. Are there wetlands in your section? If so, are they degraded by
   (*circle*) phragmites purple loosestrife fill blockage of water ditches
   disturbed stream banks pipes sediment trash other don't know

**If you have taken photographs, you could note locations by marking on map #1, #2,...#3, etc. Make sure you mark photos on back with date and location and direction of view. Be as specific as possible so that people can go back and compare later photographs. Mention nearby bridge, road, house, etc.*

Figure 7.

II. Stream Corridor Conditions

A. STREAM BANK

1-2. Overhanging trees and shrubs are important for keeping the stream cooler. Cooler temperatures means the stream can hold more oxygen. Shoreline vegetation is essential for habitat for both fish and wildlife in the corridor. Vegetation can prevent erosion, sedimentation and polluted runoff from reaching the stream. The condition of the bank is directly related to the health of the river.

B. PIPES

Storm drain pipes bring to rivers runoff from roads, parking lots, houses, leaking septic systems, lawns and gardens. In other words, storm drain pipes discharge *nonpoint source pollution* to our rivers from many of our land uses. In addition, illegal drain pipes bring gray water from houses and chlorinated water from swimming pools. It is particularly important to note flows from pipes in dry weather. These flows may indicate illegal hookups. Note the color of the discharge; estimate the diameter of the pipe and the amount of the flow. Do not touch the flow; it may be contaminated. Mark the locations on your maps and, if possible, take pictures of them. If you know that your river has many pipes, you may want to do a separate pipe survey. Included in this manual is a pipe survey sheet and instructions.

C. LITTER AND TRASH

Litter and trash often get hung up on snags in the river. Note the amount of trash, its type (paper, plastic, tires, shopping carts, refrigerators, cars!) and describe potential clean up areas. Groups often work not only to clean up the trash, but also work to stop future trash by educating the public and nearby businesses and stores.

D. FILL, BRUSH AND CLEAR CUTTING

It is important to identify fill and brush because it interferes with habitat and the ecology of the stream flow. Fill in wetlands and in areas adjacent to rivers is particularly damaging. Fill within 100 feet of the stream bank or wetlands falls under jurisdiction of the Conservation Commission. If you see new fill or brush piles, mark them on your maps. If you notice clear cutting, or removal of all the trees in an area adjacent to the river, mark it down on your sheets and map.

E. RUNOFF

Sixty percent of the rivers surveyed in Massachusetts fail to meet mandated water quality standards. Eighty-nine percent of those rivers fail because of polluted runoff, *nonpoint source pollution.*

F. CORRIDOR

1. **Land Uses:** Because land use affects the health of the river, it is important to document the major land uses in your river segment. Note if lawns are buffered by natural vegetation along the river to protect the river from nutrients and provide habitat, or if they go to the waters edge. Note new construction sites near the shore and see if there are erosion and sedimentation controls in place. Write down signs of erosion including muddy water, sediment deposits or undercut banks.

2. **Public Access:** There may be some unofficial access points which people enjoy using. Some of these need to be formalized and protected. You may want to talk with your Conservation Commission or Land Trust about ways to protect these sites.

III. Wildlife

A. AQUATIC:

In addition to noticing aquatic life as you answer the Survey questions, ask anglers for their observations and include them.

B. AQUATIC/LAND SPECIES WHICH ARE DEPENDENT UPON THE RIVER

These species should be noted on the data sheets. To learn if there are rare or endangered or state listed species along your river see the copies of Estimated Habitat Maps of rare state listed wetlands wildlife published by the Natural Heritage Program. These maps, which can be found in your Conservation Commission office, show roughly where rare and endangered species exist. If you find evidence of rare and endangered species, you will want to photograph them and use forms from the Natural Heritage Program to document them for the state. Forms can be obtained from the Natural Heritage Program, DFW, 19th Floor, 100 Cambridge St., Boston, MA 02202. Documentation may offer extra protection.

II Stream Corridor Conditions...*Answer questions and *locate problem areas on map.*

A. Stream Bank

1. Do trees and shrubs overhang the stream and provide shade?_____

If yes *estimate what % of bank is shaded.*_____%

2. *Circle most widespread stream bank condition.*

Eroding Cleared/cut Developed(buildings or pavement) Wetlands/marsh
Riprap/channelized Lawns Forest Vegetated (shrubs, plants) Beaches

B. Pipes

*Describe pipes on pipe sheet and *locate on map as P1, P2,...P3 etc.*

C. Litter and Trash

*Describe below any potential cleanup areas. *Locate on map*

D. Fill, brush and clear cutting

**Locate on map as fill (F1, F2,...F3) or clear cutting (CC1, CC2,...)* and *describe below.*

E. Runoff

Did you see runoff from any of the following? *(circle)*

Manure Farm animals Bridges/roadways Construction sites Sewage
Parking lots Lawn fertilizer Plowed fields Other sources_____

F. Corridor

1. What are the land uses in your segment? *Check which ones*, and *circle the **dominant** land use type.*

____ Industrial	____ Landfill(s)	____ Wastewater treatment plant (s)
____ Commercial	____ Undeveloped/unprotected land	____ Junkyard(s)
____ Agricultural	____ Road(s)	_____Illegal dump(s)
____ Residential	____ Railroad(s)	_____Protected Conservation Land
____ Golf Course(s)	____ Parking lot(s)	_____Other (describe)

2. Is there public access to the stream? If so, is access appropriate for... *(circle)* and **locate on map.*

canoeing fishing swimming walking(trails) other_____

*If there are areas which are **potential** access points, describe below and *locate on map.*

III. Wildlife...*Estimate number encountered and species in the following categories.*

A. Aquatic

1. Fish or evidence of fish? _____

If possible, *describe species & size below.*

2. Other forms of aquatic life? *Circle type and if you can identify species, do so below:*

Aquatic insects Turtles Snails Salamanders Mussels Clams Other_____

B. Aquatic/land Species

1. Animals or evidence of animals? *(Circle)*

Beaver Muskrat Otter Other _____

2. Water fowl? _____ *Identify species if you can.* _____

3. Do you know if there are rare & endangered species of plants or animals in your segment?

*If so, identify.*_____

IV. *Figure 7*: Shoreline Survey Summary Sheets

The summary sheets are designed to give a "big picture" of your segment. They provide the basis of the narrative description of segments in the Shoreline Survey Report. (See *Figure 13*.)

Shoreline Survey Summary Sheet

NARRATIVE DESCRIPTION
Describe your segment in a paragraph. (See samples below)

Samples:
Segment 1 extends from the headwaters near Sunshine Drive downstream approximately 0.5 miles and is a seriously damaged portion of the river. Most of the brush has been removed during construction of single family residences thereby reducing bank stability and subjecting the soil to erosion by water. Over 40% of the streambank has been affected to the point that it is now contributing excessive quantities of sediment. Trash, tires and yard debris are commonly seen through out this segment.

Segment 2 flows slowly through this 0.5 mile segment and is virtually undisturbed. The land is owned by the State Department of Fisheries and Wildlife. Vegetation within the upper bank ranges from thick stands of marsh grass to open woods of cedar trees.

Segment 6 flows south between the railroad and Interstate Highway 5 through dense blackberry, willow, marsh and other trees. Surface runoff from light industry at the southern section as well as railroad practices may be contributing sediments, toxins, oils and greases or nutrients.

Samples are taken from EPA's manual Streamwalk.

NARRATIVE DESCRIPTION FOR SEGMENT # ___ OF THE _____(River, Brook). The segment begins at _____ and ends at _____.

Figure 7.

SHORELINE SURVEY SUMMARY SHEET

Segment Begins_____

Segment Ends_____

Observer:_____ **Date:** _____

Today's weather:_____

Weather over past 24 hours:_____

Please answer the following:

River quality: Looking back at your Field Data sheet and including observations,

1. Are there places which need to be monitored further? *(Circle)* **Yes No.** Identify.

2. Are there problem areas which require immediate action? *(Circle)* Yes No. Identify.

3. Are there places which require a clean up? (Circle) Yes No. Identify.

Habitat: How would you describe habitat in your section?

1. Adequate water flow for the season?
   (Circle) Yes No Don't know

2. Did you see evidence of siltation from roads, bridges, pipes, construction? Yes No If yes, *circle if widespread or localized.*

3. Majority of river bank vegetated, developed or clear cut?

4. Shade along stream?

5. Diverse number of species seen?

6. Did your section contain wetlands? *(circle)* Yes No
   - If yes, were they in your opinion *(circle)* healthy degraded
   - If degraded, were wetlands degraded by
   (circle) phragmites purple loosestrife fill blockage of water
   ditches disturbed stream banks pipes sediment trash other *(describe).*

   - Should action be taken to restore wetlands in your section?
   (*circle*) Yes No Don't know

Overall, the section of the river is *(circle):*
Excellent good fair poor degraded.

Land Protection: Did you find any large tracts of open land which need to be protected? Describe.

Did you find areas which could be explored for trail development or fishing or canoe access? Describe.

Are there informal access points? Describe.

Please hand these sheets to the Shoreline Survey Chair or to your Segment Captain. Thank you very much!

B. Conducting a Pipe Survey

The purpose of the Pipe Survey is to learn if storm drains and pipes are flowing in dry weather. Because storm drains are designed to bring storm water to the river, they should flow only during and just after a storm event. If they are flowing during dry weather, they may be bringing pollutants to the river. Some of the sources of these pollutants could be leaking septic systems or illegal hook ups. It is therefore very important for groups to answer questions about weather conditions on both these data sheets as well as on the basic Shoreline Survey Field Data Sheets.

Some groups do a Pipe Survey as part of their basic Shoreline Survey; other groups find that there are too many things to record to combine the two surveys. They do pipe surveys separately.

To conduct a shoreline Pipe Survey, groups walk along the river where it is accessible, drive to roads or parking lots that abut the river or tributaries. Bridges are a good location to look for pipes that are street drains but which may also have illegal tie ins or groundwater infiltration.

CAUTON: Do not cross private property without permission. Do not touch the liquid coming out of the pipe. Do not put your head or hands inside the pipe

Filling out the Pipe Survey Forms (see *Figure 8*. The first row has been filled in as an example. For sample pipe survey map, see *Figure 1A*.)

Pipe #: Write your numbers chronologically beginning with # 1. For a long stretch or one with many pipes, you may need to photocopy more than one sheet per section.

Date: Fill in the date you did the Shoreline Survey.

Time: Write the time you checked each pipe.

Weather today: Describe if the weather is sunny or overcast. Include the air temperature and, if possible, the water temperature.

Weather in last 48 hours: Describe the weather in terms of last rainfall.

Pipe material: Describe the material as best you can (concrete, plastic or metal.) If the pipe is cracked, corroded, or discolored mention this too.

Pipe size and amount of flow. Indicate the pipe diameter either by measuring through the center or estimate if measuring is not possible. Indicate amount of flow by drawing the water level in the pipe and describe whether the flow was roaring, moderate, a trickle or dripping.

Color of flow: Describe the color as best you can. Color can be clear, clear with a sheen, rusty brown color, reddish brown, green or whitish. If the material is very solid or has particles in it, you may want to indicate this here.

Odor: Describe the odor as best you can. Odor can range from no odor, to dank and musky, strong musky, fetid (rotting), urine, sewage, to chemical (acrid).

Comments: Note what the pipe seems to be used for. It may be a storm drain (a device for taking rain water from parking lots and roads.) The pipe could be a hose from a house or a swimming pool. If you think the pipe is one that should be monitored further or requires action, write those comments in this column.

If possible, return to drain pipes under different conditions: different times of day, different days of the week, different weather conditions, to see when they are discharging.

ABOVE ALL, BE CAREFUL. ALTHOUGH THE WORK YOU WILL BE DOING IS VERY IMPORTANT AND MUST BE ACCURATE, YOU SHOULD BE AWARE THAT AS VOLUNTEERS ANY ACCIDENTS THAT RESULT ARE ONLY COVERED BY YOUR OWN INSURANCE--USE CARE AND COMMON SENSE.

Figure 8. Pipe Survey

Segment#_____ Names of observers:_____

Pipe#	Date	Time	Weather today	Weather in last 48 hours	Pipe material	Pipe size/amount of flow	Color of flow	Odor	Comments
Sample #1	5/8/93	8:40AM	sunny + clear air temp 75° water T° 60°	clear, no rain	concrete good shape	constant moderate flow 36" diameter	reddish brown	fetid odor	Storm drain. needs to be rechecked.
1									

C. Conducting a Bridge Survey

Bridges represent the intersection of human traffic and rivers. They are the most likely place for us to gain access to the stream. They are also likely places for stormwater to carry road and road maintenance impacts to the stream. You will need one data sheet for each bridge.

1. Access: You will want to identify existing access points on your map and know which ones are permanently marked and open to the public and which ones are dependent upon landowners whims. Having this data can allow your group to work to improve access. Your group may want to work with town officials, land trusts, and landowners to formalize access points. There are several ways to do this. In Norwood, MA, the town planner and the Neponset River Watershed Association recently celebrated the donation of a canoe access point from a local business. In Lincoln, the Conservation Commission has created canoe access with parking provided on conservation land. On publicly owned land, groups work with the Public Access Board to create public access. To get in touch with the Public Access Board and learn how you can work together, call Jack Sheppard, Director, Public Access Board (617-727-1843). Jack Sheppard and his staff can sometimes do site inspections to see if the area fits Public Access Board criteria. If the land is on State Highway Department land, work with the MA Highway Department and Public Access Broad. For more information, call Russ Cohen (617-727-1614 X 384) at the Riverways Office.

2. Navigation: Information from these questions could be part of a future canoe guide. For example, you would learn which bridges required portaging for canoeists. If, and when the bridge needs repair or reconstruction, your data might help redesign the bridge for better navigation purposes. (See Appendix C for suggestions about protecting rivers during bridge construction.)

3. Road runoff: Sediment, and the accompanying toxics which bind to sediment, harms river ecology by burying habitat for aquatic organisms. Direct, untreated roadway discharge can silt in a stream and alter stream chemistry. By identifying serious problem areas (ones with a great deal of sediment, or areas which are prime habitat for fish or for aquatic insects), groups can work with town officials and DPWs. Some communities have created Best Management Practices such as (1) removing asphalt from the swales (at the least, your information could help prevent new asphalt swales from replacing vegetated ones); (2) allowing vegetation to help trap the sediment; and (3) building retention basins. Recently, the Jones River Watershed Association and the North and South Rivers Watershed Association received grants to build systems that infiltrate and treat stormwater at critical areas.

4. Effect on river channel: These questions look at how the bridge affects the river itself.

If the bridge is culverted (ie. the bottom of the stream surface is part of the bridge structure, or in other words, the stream is in a pipe or box), it can impair fish migration.

1) Long or steeply sloped culverts can impair migration by inland or anadromous fish.
2) Improperly sized culverts increase downstream velocity and scour downstream invertebrate and fish bottom habitats.
3) Some fish, alewives in particular, will not cross long, dark culverts.
4) In addition, flat culvert bottoms create shallow water which serve as barriers to inland fish species.

After floods, when backed-up water behind the bridge is released, it can scour out the stream bottom, create pools, and transport sediments downstream. This can be beneficial, creating a pool for habitat or fish, or detrimental, removing riffle areas that support aquatic insects. Degradation also occurs if the sediment from the scoured area is deposited in areas of good habitat or if the pool is undercutting the bridge. In noticing the differences in bottom composition above, under and downstream of the bridge, watch for deposits of sand, sand bars and fine silts. Look also for undercut banks.

5. Floating debris: Answers to these questions can become part of your data for determining if and where a clean up is needed.

6. Note other observations about the bridge: is it in disrepair? is it scenic? is there signage identifying the river or brook? or any miscellaneous observations you note.

Figure 9. **BRIDGE SURVEY DATA SHEETS**

Identify the Bridge by name or by naming the street or road. If the road crosses the river at several bridge crossings describe the neighborhood._____.

1. Access: Is there river access? (Indicate yes or no with a "Y" or an "N")
   ___Easy carry on access for canoes?
   ___Fishing access?
   ___Boat ramp for motorized boats?
   ___Safe parking for cars? If yes, how many cars:_____
   ___Posted "No Trespassing" signs?
   ___Do you know who owns the land around the bridge? If yes, circle town, state, private owner. If you know, give the owner's name.
   ___Potential for access? If so, indicate which uses by circling: (canoeing; fishing; motorized boats; parking for cars; parking for trailers)

2. Navigation: (Indicate yes or no with a "Y" or an "N")
   ___Are the bridge pylons (bridge support structures) close together?
   ___Would the current carry a boat into a bridge pylon or abutment?
   ___Is there adequate clearance under the bridge for boats?
      ___During normal flows?
      ___Even during high water?

3. Road Runoff: Are there noticeable effects of road runoff? (indicate yes or no with a "Y" or "N".)
   ___Does the road drain to the river by pipe, shoot or swale?
   If so, describe the size and location of any pipes, shoots or swales:

   ___Is there evidence of erosion caused by the drainage system?
   ___Is there evidence of sediment being deposited below the drainage pipe?
      If so, approximate the amount (in square feet)

4. Effect on river channel: Has the bridge had an impact on the river channel?
   ___If the bridge is culverted, does it prevent fish or wildlife migration?
      If so how:

   ___Is there a pool just below the bridge?
   ___Are there similar pools on the river which appear natural?
   ___Is there a difference between the bottom composition upstream and downstream or under the bridge?
   ___Has the river undercut any of the bridge abutments?

5. Floating debris:
   ___Is there evidence of floating debris collected on the upstream side of the bridge?
   ___Is the debris backing up flood water?

6. Other observations: Is it in disrepair? Is it scenic? Is there signage identifying the river or brook? Other comments?

Wetlands Survey Sheet

Observers:_____
Segment:_____ **River Group Name:**_____
Watershed:_____ **Town:**_____ **Date:**_____

I. (*Summary Question*) Number of wetlands in your segment? _____ (Answer from map or at end of survey.)
•If there are several wetlands of the same type, combine your answers if you can. Some observers may need more than one survey sheet.

II. Type of Wetland: (*See Appendix D, **Wetlands Primer***)
A. What type of wetland is it? (*Please fill in box(es).*

Inland
a)Type: (*Circle*) Marsh wet meadow bog shrub swamp hardwood swamp evergreen swamp
b) Dominant plants (if known):

Tidal
a) Type: (*Circle*) Salt/brackish marsh Fresh water marsh

B. What is the approximate size of the wetland? *One football field equals approximately one acre.*
(Circle) Less than 1 acre; 1-5 acres; 5-10 acres; 10-50 acres; more than 50 acres.

C. What is the overall condition of the wetland: *(See Appendix D, Wetlands Primer)*
(Circle) Excellent; Good; Fair; Poor; Degraded; Extremely degraded Don't know.

Wood duck

D. What are the land uses in or adjacent to the wetland? (If adjacent, try to estimate number of feet from wet area: _____ feet.)

(*Circle*) Industrial commercial agricultural residential golf course landfill marina mooring area protected open space undeveloped other.

What is the dominant land use?

E. Draw a plan of the wetland area showing features such as nearby streams, roads and other prominent reference points. Be sure to show the location of subject wetland and impact areas - fill, stormwater discharge pipe, ditch, or tide gate. *(Use a separate piece of paper.)*

III. (*Summary question*) Are there wetland issues that should be included in your group's action plan? *Fill out this question at the end of your survey.*

1) Problems:
Describe.

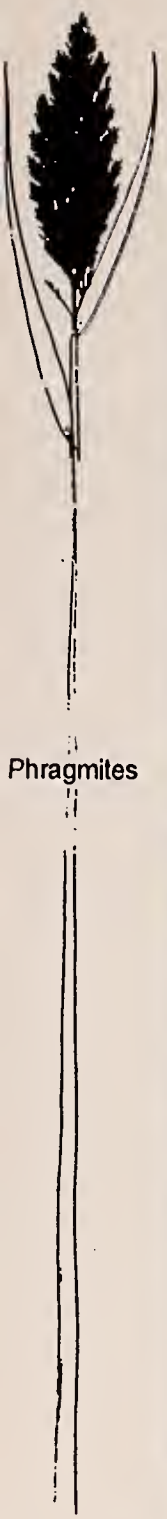
Can you suggest a remedy: (*Circle*) Reporting to Conservation Commission? Wetland Restoration & Banking Program? Purchase? Other? (See *Appendix D, Wetland Primer)*

2) Do you have any knowledge of the wetland's history, habitat, wildlife species including rare and endangered species, importance to river for flooding or water storage?

(over)

IV. *Please fill out the wetlands matrix. Note that each question has several parts - horizontally.*

1. VEGETATION 1a. Phragmites present? (*Circle*) Y N Estimate % wetland that has phragmites: *(Circle to the nearest percentage)* 5% 25% 50% 75% 100% Comments:	1b. Purple loosestrife present? *(Circle)* Y N Estimate % of wetland that has loosestrife: *(Circle to nearest percentage)* 5% 25% 50% 75% 100% Comments:	1c. Vegetation removal by cutting or by bulldozer or other means? (*Circle*) Y N Comments:	1d. Is the area mowed? (*Circle*) Y N Comments:	1e. Is the area grazed? (*Circle*) Y N Comments:	1f. Are wetland streambanks denuded? (*Circle*) Y N Comments:	1g. Other signs of wetland streambank disturbance? *(Circle)* Y N Describe:
2. CHANGES IN WETLAND ELEVATIONS 2a. Is there fill in the wetland? (*Circle*) Y N Is there fill on land adjacent to wetland? *(Circle)* Y N	2b. Type of fill: (*Circle*) trash, dirt, concrete/pavement, rocks, dredged material, other?_____	2c. Location of fill: (*Circle*) In wetland itself; along edge; in water.	2d. Is there a manmade berm or levee? (*Circle*) Y N	2e. Is there evidence of sediment deposits in wetlands? *(Circle)* Y N	2f and g. Additional remarks.	
3. HYDROLOGY CHANGES 3a. Are drainage ditches present in the wetland? (*Circle*) Y N Comments:	3b. Specify dimension of ditches: _____width _____depth	3c. Has the wetland been scooped out (excavated)? (*Circle*) Y N	3d. Evidence of dead or dying trees in water? (*Circle*) Y N How extensive?	3e. If tidal, is the flow restricted by a tide gate or other structure? (*Circle*) Y N Describe:	3f and g. Additional remarks:	
4. WATER QUALITY DEGRADATION 4a. Is there a stormwater discharge pipe entering the wetland? (*Circle*) Y N	4b. If there is a pipe, what is the material? _____ What are the dimensions?_____ Comments:	4c. If there is a pipe, is there a noticeable increase in sediment in the wetland near pipe? (*Circle*) Y N	4d. Describe the effects of the discharge:	4e. Is there evidence of oil or other pollutants in the wetland? *(Circle)* Y N Describe.	4f. Are wetland streambanks heavily eroding? (*Circle*) Y N	4g. Additional remarks:



Phragmites

Purple loosestrife.

V. Do you have any additional comments?

Please give a copy of this report to your team leader. In order to assist in a statewide inventory, please send a copy of the wetland survey to: Ralph Tiner, Wetlands Restoration & Banking Program, Executive Office of Environmental Affairs, 20th Floor, 100 Cambridge Street, Boston, MA 02202 Thank you!

SECTION III

TAKING ACTION PRESENTING DATA AND DETERMINING GOALS AND PRIORITIES

III. Taking Action: Presenting Data and Determining Goals and Priorities

1. Reporting back to the group

a) Mapping the results

Soon after the Shoreline Survey, hold a meeting to recap what people have seen. Bring in your base map which you prepared when creating your segment maps. Your base map could be an enlarged topographic map, or you could piece together sketch maps, or assessors' maps. As the surveyors report their findings, ask someone to color code the results. For example, red dots could indicate leaking pipes, orange dots could represent sewage; black dots could mean trash; green dots could represent habitat that should be protected. Your map becomes a tool for taking action, a yardstick to measure your successes as the problems are solved, and a comparison for future shoreline survey work. If you want to preserve your base map, you can use a mylar overlay for your results.

b) Reporting the results

Beginning upstream, for each segment, surveyors describe problems (leaking pipes, erosion, sedimentation, poor land stewardship, discolored water, sewage) and assets or resources (good habitat, access points, trails, potential land purchases) and determine the most important things they found which become the priority items. Flip charts (or large sheets of paper) are good tools for this work. As segment 1 is reported, someone writes the problems on one sheet, the assets on a second and priorities on the third. Both seeing and hearing the material helps the group gain a holistic picture of the river system. Using these flip charts, make a Priority Chart for easy reference. (For a sample Priority Chart, see *Figure 11*.)

2. Determining the action plan

At a second follow up meeting, create your action plan from the priority items on your Priority Chart. Again using flip charts, work with the group to determine (1) which items need to be reported to town boards; (2) what items make good short term projects that benefits and raises awareness about the river; and (3) what the group sees as its goals for long term action. If scheduling permits and you feel it would be helpful, the Adopt-A-Stream coordinator can help facilitate this meeting. Summarize the decisions made at this meeting by making an Action Matrix. (See *Figure 12*.) These meetings are usually lively and interesting. Volunteers like knowing their work is leading to action. In a brief time period--three or four meetings and the survey itself - you will have done field work and community consensus building. These components are the beginnings of an action plan for your stream.

It is important to invite members of town boards - the Conservation Commission, Board of Selectmen, Board of Health - to come to this meeting and help with the consensus building. Board members are interested in learning about the results of the survey; few towns have staff or volunteer members with time to survey streams. In addition, they often help with action items. For example, a member of the Board of Selectmen can easily talk with the DPW, which it supervises; the Conservation Commission can look into certain problems within 100 feet of a stream; the Board of Health may be able to test water quality to learn if a pipe is contributing coliform to the stream. Many groups find instant action this way. Furthermore, when you are ready to present your formal report to a board, you have a working relationship with at least one member who has briefed the rest of the board.

3. Creating a Time Frame

The final planning stage is the creating of a time line. This gives your group an opportunity to determine when to implement the action suggestions. There are two pages to this time frame. The first determines how, by whom, beginning date and target date. The second chronicles your successes. A list of successes is important for press releases, for grant writing, and for improving moral when your group feels overworked. It is a way to reward the volunteer efforts of individuals by listing their work on the success chart. (See *Figure 13 A and B*. See Appendices E-H for Action Sheets.)

4. Publishing your data and working with town boards and state agencies

From the summary sheets and your data sheets, the Steering Committee can put together a Shoreline Survey Report which you can name "Status of the _____ River, Based on the Shoreline Survey of 1995". You will want to include copies of the maps in the report as well as a narrative description of the segments and the data sheets. Try to include photographs. The report should be dated and contain the names of the volunteer surveyors, and a description of the methodology used. (See *Figure 14* for an outline of a Sample Shoreline Survey Report.)

5. Forming an Adopt-A-Stream group

If you are not already an official "Adopt-A-Stream" stream team, consider becoming one as you complete your Shoreline Survey. Riverways/Adopt-A-Stream is currently working with 140 groups across the state. Riverways/Adopt-A-Stream provides materials, workshops, networking, telephone assistance, and occasional site visits. (See *Figure 1A* and Appendix J for information about the Adopt-a-Stream Program.) Call the Riverways/Adopt-A-Stream Program at 617-727-1614 X 384.

Figure 11. **SAMPLE PRIORITY CHART**: Excerpts from Mother Brook Priority Chart

Problems found. See map for location. Reporters and general description of segment.	**Natural Resources found**	**Priority work**
Segment X: Mother Brook Condominiums to Hyde Park Team Leader: _____ 1) refrigerators, tires and car parts at DPW site 2) pipes on bank 3) car parts, rotting old stored trucks on car company land 4) constantly flowing pipe; water flows over car parts: oily sheen noticed 5) dumping & evidence of backhoe work 6) 18" pipe with milky white discharge (paint or sandblasting residue?)	1) wetlands and a grassy meadow at housing project 2) potential for terrific public access 3) marsh has great potential	1) The 24" pipe 2) Litter and trash 3) Find out from DEP which businesses have NPDES permits
Segment X: Washington St. to Maverick St - Cemetery Side Team Leader:_____ 1) no trees, erosion, dirt over fence on the bank 2) cemetery fill from grave sites was pushed directly on to unstable bank slope. 3) trash: old refrigerators, tires	1) possible access from cemetery 2) possible trail	1) trash and fill on banks. 2) potential trails
Segment X: Bussey Street to Mill Lane Team Leader: _____ 1) trash on both sides of brook 2) logs, road construction sites, 55 gallon drums, old steel desk 3) brownish-gooey material 4) Condon Park: fill and trash (concrete blocks, old bikes, pipes, old motor parts) 5) inlet near Con Gas which gives off a rotten egg smell; degraded with petroleum products and runoff from dumpster containing hot water heaters, 6) duck feeding area	1) residential side of river cleaner 2) duck feeding area is attractive (but is it a source of coliform?)	1) culvert and inlet at Con Gas 2) trickle of sewage coming out of a 2" pipe just before the bridge

Figure 12. ACTION PLANNING MATRIX: Taking each priority item, members of the Mother Brook Coalition agreed on action steps to take. The results were placed in a matrix. Parts of the matrix are included here. (Excerpted from Mother Brook Coalition Action Plan.)

IMMEDIATE ACTION: Reporting Problems to Officials

From its priority findings, the Mother Brook Coalition members created a list of problems that must be reported.

Report:

To DEP and Conservation Commission

1) outflow pipe: running over car parts
2) Serious pipe problem noted (note: this problem has been resolved by Strike Force)
3) Major concern about inlet near Condon Park

To Board of Selectmen and Conservation Commission

1) transfer station debris in brook (note: forwarded to boards, still requires monitoring)
2) fill and trash on bank of Cemetery (note: forwarded to boards, still requires monitoring)

IMMEDIATE ACTION: Short Term Projects

1) Work on a trail/greenways section as first pilot. Suggestions:
    - •create a graded Trail from Bussey Street to Mother Brook Condominiums in Dedham to include a foot bridge and two picnic areas (see Appendix)
    - •create an education area behind Avery School: trail from playground to brook cleared by Middle School and High School students

2) Sponsor clean ups on Mother Brook to raise awareness about brook & remove trash. Consider National Guard for refrigerators & heavy items. Coordinate with the Dedham Civic Pride Committee for a fall clean up & Hyde Brook groups.
3) Look at erosion and see if BMPs could be installed. (CC, NRCS, others.)
4) Create a Report from Shoreline Survey & present to town, state agencies and civic organizations.
5) Sponsor an event or events which would bring Hyde Park and Dedham awareness of Mother Brook.

LONG RANGE PLANNING AND ACTION:

These activities can be the glue that holds a group together. They are the major issues on which a group chooses to focus.

A. Create long term stewardship group
B. Create Greenway, with access and trails. Do section by section. This was felt to be the most important single thing. Work would lead to
    - •greenway, a valuable resource protected
    - •consciousness raising leading to protection for Mother Brook
    - •increased town involvement
    - •funding and grants

C. Continue water quality monitoring and reporting. Include Hyde Park High School classes and adults. Add organics if possible.
D. Raise public awareness of the brook, stewardship through public education, clean ups, poster contests. Organize riparian landowners watchdog group.
E. Expand membership in Hyde Park and Dedham. Involve whole watershed.
F. Combine Historical Commissions in Hyde Park and Dedham and write history of Mother Brook.
G. Conduct inventory of wildlife and habitat in order to provide more protection.
H. Encourage wildlife by protecting, restoring and creating habitat

Figure 13 A. Action Planning Time Frame (Excerpted from Mother Brook Coalition Action Plan)

Action	Who	How	Beginning Date	Target End Date
Shoreline Survey Completed	Civic groups & residents from Dedham & Hyde Park	Adopt-A-Stream Shoreline Survey protocols	November, 1994	December 1994
Report problems to Town Boards and DEP	Group	Invited town officials to priority setting and action planning meetings; attended Technical Assistance Group Meeting.	December, 1994	May, 1995
Form Coalition & elect officers:	Group	Consensus at general meeting	January-February, 1995	February, 1995
Join Adopt-A-Stream Program	Group & Riverways staff,	Certificate at Mother Brook Day	April, 1995	April, 1995
Create brochure	Subcommittee headed by Bob	Create brochure, get funding, etc	April, 1995	June, 1995
Work on Greenway Section/costing out section	Subcommittee headed by Mary Bush Brown	NRCS estimated costs for section around	April, 1995	May 1995, costing out June 1996, complete step 1
Celebrate Mother Brook with events	Work with Civic Associations, and neighborhood groups	Cosponsor events and/or support and advertise events	March 1995	Ongoing
Sponsor Clean ups	Work with Civic Associations, towns in Dedham & Hyde Park	Through BNAF and NepRWA	Spring, fall 1994 Dedham Civic Pride; Spring, 1995, Hugh O'Brien Youth Project	Annual fall event
Continue Water Quality Monitoring	Subcommittee comprised of Dedham High School Science classes	Continue program	1980	Ongoing
Expand Water Quality Monitoring into Hyde Park High School	Subcommittee comprised of Hyde Park residents	Work with school officials and teachers	April, 1995	Water quality monitoring in Hyde Park will begin 9/95. BNAF will assist. Ongoing
Expand membership into Hyde Park and Dedham	Group	Invite groups & individuals to join	January, 1995	Ongoing
Work on identifying pipes on Mother Brook	Subcommittee from Dedham High School	Dedham High School Students trained by MA GIS to identify pipes using GPS.	April, 1995. GPS Data on Hyde Park collected.	June 6, 1995
Conduct inventory of Wildlife and habitat	To be determined (TBD)	TBD	TBD	TBD

Figure 13B: **GROUP ACCOMPLISHMENTS (Excerpted from Mother Brook Action Plan)**

When groups compile a list of their accomplishments, they find it amazing to see how much they have done. It is also an effective way to communicate about their work. This chart can be reformatted for brochures, town officials, newsletters, press releases and grant applications.

As a result of the work together on the Shoreline Survey in November 1994, the individuals and groups decided to form a coalition, which they named the Mother Brook Coalition. Their list of activities during their first six months includes:

Data Collecting:

12/94 **Shoreline Surveys** - completed Shoreline surveys
6/95 **Pipes** - students mapped all pipes with GIS after receiving training by MA GIS
7/96 **Student Monitoring Program** - group plans to expand the excellent Water Quality Program underway at Dedham High School to schools in Hyde Park.

Reporting:

1/95 **Town Officials** - group invited town officials to attend reporting and action planning sessions; officials gave suggestions for remediation
2/95 **Technical Advisory Group (TAG)** group presented results of the Survey and action plan to the Neponset TAG at a meeting sponsored by NepRWA. TAG members include representatives from EOEA, EPA, NRCS, Boston Water and Sewer Commission, Polaroid Corporation, Hollingsworth and Vose who advised the group on next steps.

Greenway:

1/95 **Planning** - group decides to implement Greenway Plan previously created by Mary Bush Brown
2/95 **Planning** - first part of Dedham Greenway costed out by Natural Resources Conservation Services (NRCS; formerly called SCS).
4/95 **Clearing** - Avery Trail: students cleared trail behind elementary school
5/95 **Planning** - group presented plan for linear trail at Condon Park to Dedham Conservation Commission; group began compiling Notice of Intent
5/95 **Planning** - group met with Boston Natural Areas Fund, the Trust for Public Land and the City of Boston's Environmental department to create a park on a vacant lot on Reservation Road along Mother Brook
6/95 **Planning** - group met with NRCS staff to flag the proposed trail for Condon Park Days.
6/95 **Planning** - group met with Dedham Parks and Recreation Commission who will attempt to fund specific items when needed

Remediation, prevention and restoration:

2/95 **Transfer Station** - as a result of the Reporting Follow up session, a selectmen met with Dedham Transfer Station representatives. Together they created an *Environmental Transfer Zone* between the transfer station and the brook that was to be litter free.
4/95 **Pipes** - company corrected all legal responsibilities for pollution observed by Shoreline Survey and resolved Strike Force Investigation (fine $250,000). Company joined the Mother Brook Coalition.

Public Education and constituency building:

3/95 **Public Relations** - the group created a large banner, a logo, and brochures.
5/95 **Corridor protection** - the group informed citizens about its plans on Cable TV Show
5/95 **information booth** - Mother Brook booth at Condon Park Field Days; raised $130 from new members during the day
6/95 **Clean ups** - Hugh O'Brien students/Mother Brook Coalition and NepRWA.
6/96 **Display** - Display at Eastern Mountain Sports: video, plans for greenway and brochures

Organization:

2/95 **Officers** - elected at general meeting
3/95 **Fundraising** - The group received $700 from Coalition members including the Company that had violations.
4/95 **Recognition** - Adopt-A-Stream award, Certificate from Representative Scaccia, EOEA recognition award to Dedham High School

a) Working within the town

The Shoreline Survey Report can be presented to town boards (with the press present) and can be filed in the town library. At the time of the presentation, include an oral presentation. Arrange a meeting with the Board of Selectmen, the Conservation Commission, and, where indicated, the Board of Health and the Department of Public Works. You may also want to meet with civic groups and neighborhood groups. Some groups have made graphics which include the base map, photographs and descriptions. (For an example, see *Figure 14*.) Other groups have held meetings with slide shows or presentations or combined both with a pot luck supper.

b) Working on a watershed-wide protection strategy

It is important to share a copy of your subwatershed Shoreline Survey Report with the larger watershed association. Once a number of Adopt-A-Stream Teams have completed Shoreline Surveys, Shoreline Survey Reports and Action Plans, they will constitute a major part of a watershed-wide protection plan.

In addition, copies of the report will be useful to state agencies that are active in your watershed. The Riverways/Adopt-A-Stream Programs, DFWELE (19th Floor, 100 Cambridge Street, Boston, MA 02202), and Office of Watershed Management, DEP (40 Institute Road, North Grafton, MA 01536) are two state agencies that would appreciate copies of your report. DEP is collecting data for its watershed-based work. See Appendix H for a schedule of their basin work. In watersheds where MDC is active, they will want a copy of your report. Executive summaries would be welcome at your Regional Planning Agency, Massachusetts Watershed Coalition and at the regional Conservation District Office.

***Figure 14*. SAMPLE SHORELINE SURVEY REPORT**

"Report of _____ Brook, based on Shoreline Survey, October, 1994"

Table of Contents

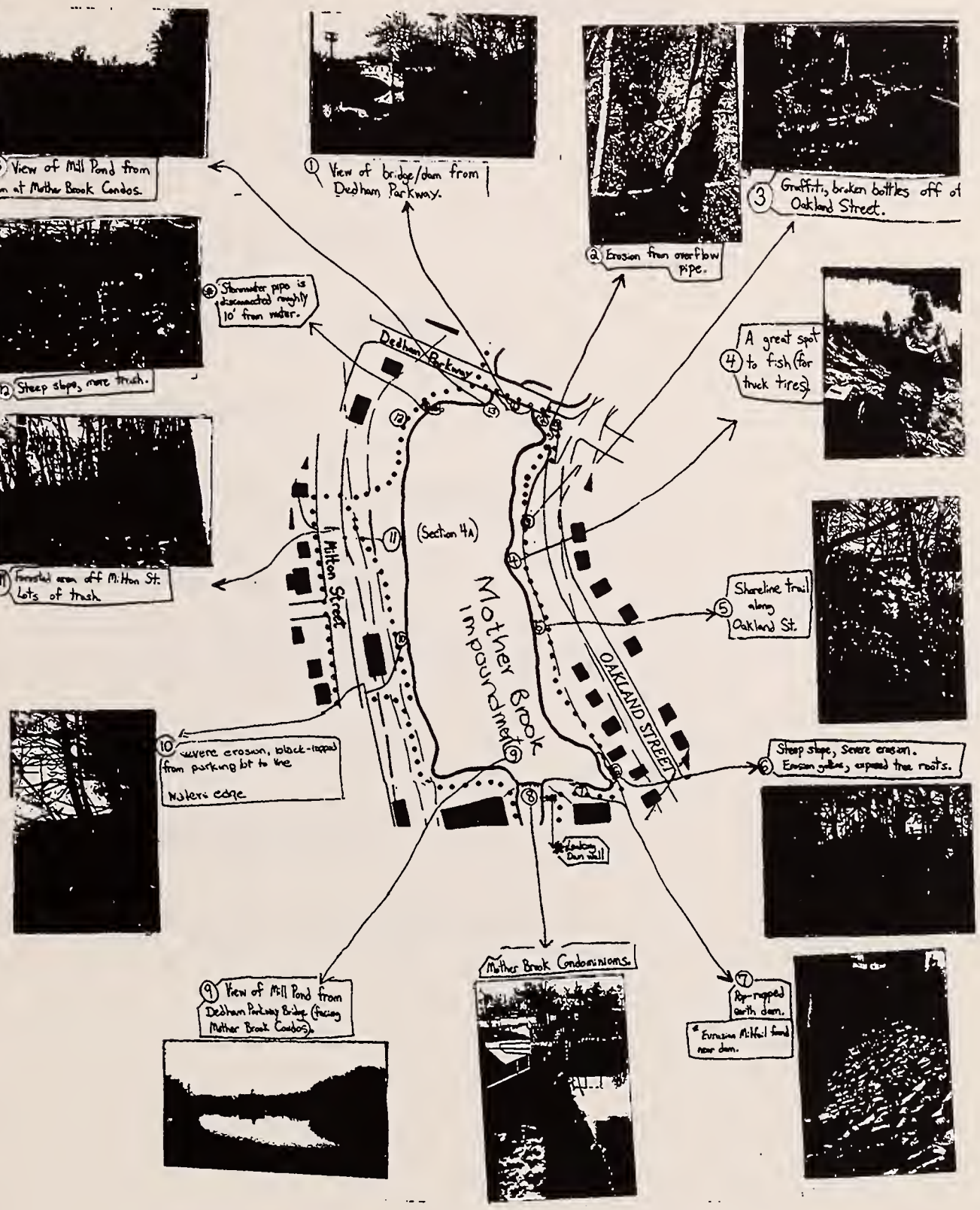
I. Part I: Summary
- A. Executive Summary: a descriptive summary of the Shoreline Survey findings.
  1. Group description: name and description of group conducting the Shoreline Survey
  2. Description of methodology used in Shoreline Survey
     - a) goal setting
     - b) outreach
     - c) training session
     - d) data sheets
     - e) photographs
  3. Description of findings, water quality, main problems, resources, state of the resources (protected, not protected), and potential areas which could be protected or opened up for recreational purposes.
  4) Acknowledgements of help whether from town and state officials, landowners, businesses, cable TV, press, volunteers, etc.

- B. Priority Chart summarized by segments
- C. Action Chart describing both immediate and long range action

II. Part II: Information by segments
- A. Segment 1: headwaters from .... to .....
  1. Narrative description (from summary data sheet)
  2. Data sheets (including surveyor's names)
  3. Map
  4 Selected photographs

- B. Segment 2.....

Figure 15. **SAMPLE POSTER FOR PRESENTATIONS TO TOWN BOARDS.** (Bob Hartzel of the Mother Brook Coalition.) Map of a segment of the brook is shown with photographs and a description of the problem or asset.


(13) View of Mill Pond from dam at Mother Brook Condos.
(1) View of bridge/dam from Dedham Parkway.
(2) Erosion from overflow pipe.
(3) Graffiti, broken bottles off of Oakland Street.
(4) A great spot to fish (for truck tires)
(5) Shoreline trail along Oakland St.
(6) Steep slope, Severe erosion. Erosion gullies, exposed tree roots.
(7) Rip-rapped earth dam. Eurasian Milfoil found near dam.
(8) Stormwater pipe is disconnected roughly 10' from water.
(9) View of Mill Pond from Dedham Parkway Bridge (facing Mother Brook Condos).
(10) severe erosion, black-topped from parking lot to the waters edge
(11) Forested area off Milton St. lots of trash.
(12) Steep slope, more trash.
Dedham Parkway
Milton Street
(Section 4A)
Mother Brook Impoundment
OAKLAND STREET
Mother Brook Condominiums
Leaking Dam wall

NOTES

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APPENDIX A

AN INTRODUCTION TO STREAM ECOLOGY

AN INTRODUCTION TO STREAM ECOLOGY

ECOLOGY: the study of organisms in relation to their environment.

STREAM: a body of water moving in a more or less definite pattern through the path of least resistance to a lower elevation.

ECOSYSTEM: basic unit of ecology, an interacting system.

Running water ecosystems are hard to generalize about, varying from fast flowing, cold, headwater mountain brooks to slow moving, weedy, warm, large lowland rivers.

****** Streams are products of their watersheds! ******

STREAM HABITATS COMPARED TO POND HABITATS

	Rivers and Streams	Lakes and Ponds
Energy Sources	External	Internal
Stratification	Headwaters to Mouth	Shoreline to Offshore
Current	Major factor: gravity	Minor factor: winds
Water Conditions	Changeable but uniform	Stable but stratified

Current speed is a major determinant of stream substrates and aquatic communities.

LAND-WATER INTERFACE
Streams are intimately connected with the surrounding land. A healthy stream is a result of a healthy watershed.

TEMPERATURE
Coldwater streams - max. temperatures less than 70F, i.e. trout streams
Warmwater streams - higher temperatures, i.e. bass, catfish, pickerel

OXYGEN
Streams are generally well oxygenated, at or near saturation. Stream fish are adapted for high oxygen levels.

POOLS AND RIFFLES
Pools - areas of slow moving deep areas with fine substrates.
Pools serve as cover and resting areas.
Riffles - areas of fast moving, shallow areas with coarser substrates.
Riffles serve as food production and feeding areas.

COVER
Cover is very important to stream fish. Cover in the form of boulders and woody debris also offers attachment surfaces for invertebrates.

STREAM HABITATS INFLUENCE THE BIOLOGICAL COMMUNITY COMPOSITION.

STREAM ORGANISMS ADAPTATIONS TO RUNNING WATER.
1) Permanent attachment 2) hooks, suckers, adhesive surfaces
3) streamlined bodies 4) flattened bodies 5) orient into current

Energy Flow in streams

Much of the energy that drives the stream ecosystem is from outside the stream. Energy is in the form of organic matter such as leaves, twigs, etc.

This energy is harvested by groups of invertebrates (i.e. mayflies, stoneflies, caddisflies) called collectors or shredders.

These invertebrates are then fed on by small fish species such as shiners and young stages of other fish species.

These smaller fish are then fed upon by larger predatory fish.

Large predator fish can then be harvested by man or serve as dinner for other predators such as kingfishers, mink, otters or turtles.

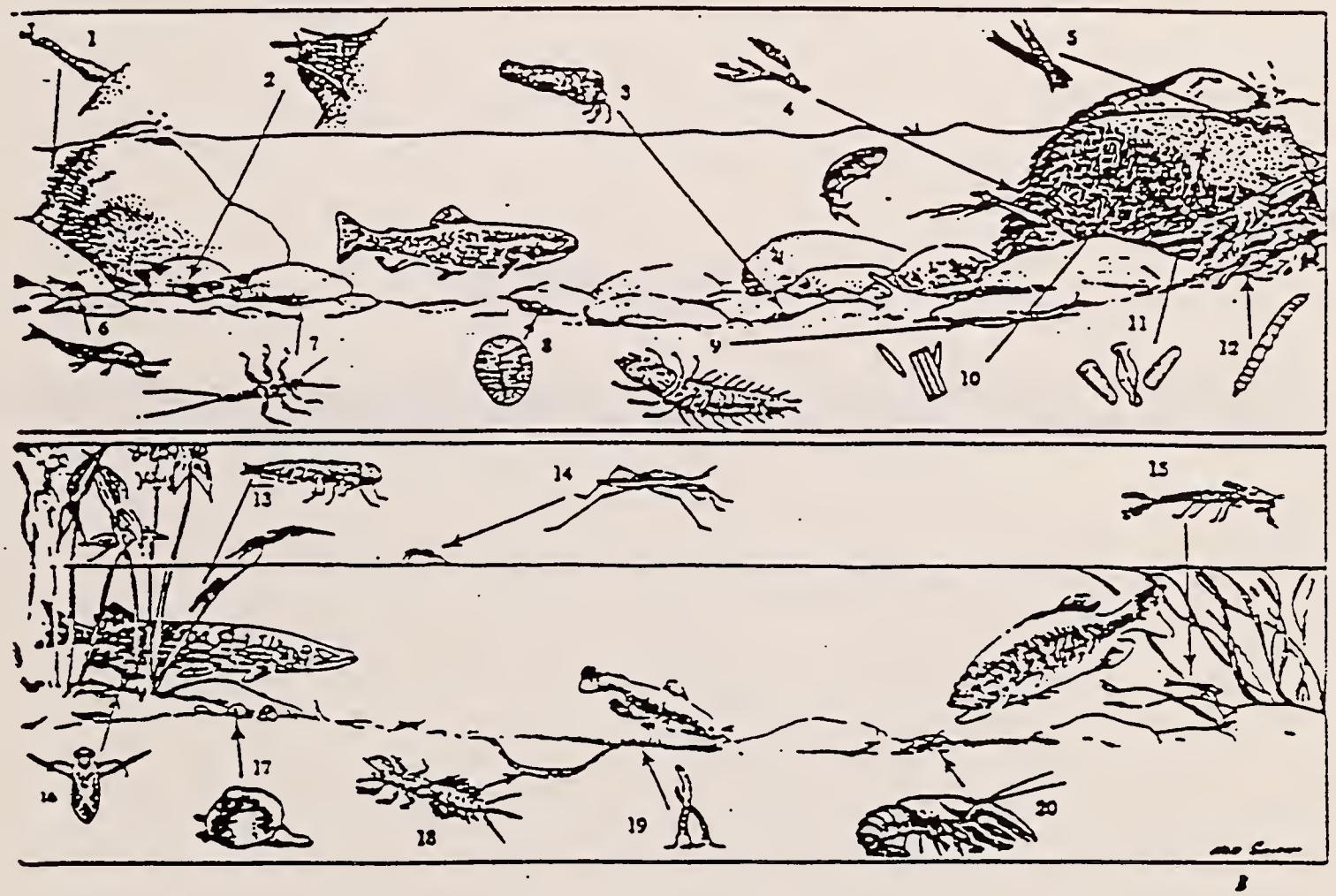


Figure 10-5. Life in a fast stream compared to that in a slow stream. (1) Blackfly larva; (2) net-spinning caddisfly; (3) stone case caddisfly; (4) water moss (Fontinalis); (5) alga Ulothrix; (6) mayfly nymph (Isonychia); (7) stonefly nymph (Perla); (8) water penny; (9) hellgrammit; (10) diatoms (Diatoma); (11) diatoms (Gomphonema); (12) cranefly larva; (13) dragonfly nymph; (14) waterstrider; (15) damselfly nymph; (16) water boatman; (17) fingernail clam (Sphaerium); (18) burrowing mayfly nymph (Hexagenia); (19) bloodworm; (20) crayfish. The fish in the fast stream, above, are (left) brook trout, (right) redbelly dace. The fish in the slow stream, below, are (left to right) northern pike, bullhead, and smallmouth bass.

APPENDIX B

PROBLEMS FROM NONPOINT SOURCE POLLUTION

Nonpoint Source Pollution

Sixty percent of the rivers assessed in the Commonwealth fail to meet federally mandated water quality standards. Eighty-nine percent of these streams fail to meet standards because of polluted runoff or nonpoint source pollution. Because the Shoreline Survey is an excellent tool to identify nonpoint source pollution, encourage those working on Shoreline Surveys to read this appendix.

Nonpoint Source Pollution and River Systems.

Sediments result from runoff from many sources including construction, farms, highway maintenance, gravel operations, logging, stream channelization, roads, storm drains and stream banks. In addition to problems caused by volume of sediment, the sediment load includes toxics and heavy metals which bond to sediments and accumulate on river beds.

Over a specific amount of time, sediments from areas where construction has drastically altered or destroyed the vegetative cover and soil mantle can exceed 20,000 to 40,000 times the sediments from adjacent undeveloped woodland. (Middlesex Conservation District. October 7, 1988.)

Sediments threaten fisheries, fill river channels and wetlands, increase flooding, reduce light and clarity, harm drinking water and damage the natural ecology of the river. Sedimentation is one of the major causes of the decline of fisheries in the nation. Sedimentation destroys habitat, including feeding and spawning areas, and can damage the respiration processes of fish.

Nutrients (especially nitrogen and phosphorous) enter rivers and streams from lawns, golf courses, farms, storm water, animal wastes, urban development and failing septic systems. Excess nutrients cause eutrophication (excessive algal and plant blooms) which clog rivers and streams, and when these plants die, deplete dissolved oxygen in the water important for fish and other forms of aquatic life. In addition, eutrophication may cause taste problems for those who depend on the river for water supply, and odor problems for those who live near or use the river.

Heavy metals (lead, copper, cadmium, zinc, mercury, aluminum and chromium) come from urban runoff, illegal dumping, or poor storage practices. They enter rivers either through storm drain runoff or bonded to sediments in runoff from the land. Heavy metals, such as mercury, have been stored on currently active or abandoned industrial sites. For example, mercury contamination from an old dye plant on the Sudbury River took years to find its way through ground water to wetlands, rivers and streams. Bottom feeding organisms consume the heavy metals with other food, and the heavy metals proceed through the food chain to affect other animals.

Toxics and hazardous materials come from landfills, junkyards, underground storage tanks, inappropriate industrial practices, hazardous waste disposal, septic systems, pesticide applications, poor storage practices, auto maintenance, runoff from highways and parking lots, and marinas. These substances accumulate in sediments or in the water column. Toxics and hazardous wastes accumulate in the food chain.

continues

Nonpoint Source Pollution and River systems (continued)

Pesticides and herbicides from agriculture, lawn care, golf courses, and urban runoff accumulate in sediments. These poisons can kill aquatic organisms, harm water supplies, and increase the risk of public health. Many of these substances are carcinogens.

In 1962, in her book Since Silent Spring, Rachel Carson warned not only about fish kills from pesticides and herbicides, but also of the dangers of mixing many different chemicals together in our rivers and streams. These chemicals form combinations that can be more lethal than the original applications.

Bacteria and viruses from failing septic systems, from farm feed lots and manure piles, from animal wastes, and from storm water runoff degrade water quality and threaten life systems. Recent studies in coarse soils such as found on Cape Cod have shown that some viruses can travel much further than previously thought. Studies have shown viruses 2 feet--2723 feet from the septic system where they originated. Additional studies are needed to address these problems.

Salt comes from highway department storage, snow removal practices including road maintenance and disposal of salt-laden snow. Accumulations of salt in small streams can harm human health if used as a drinking water source and can harm aquatic organisms and the ecology of the stream. Once salt gets in ground water, sources of drinking water can be destroyed.

Thermal pollution usually refers to an increase in the stream temperature. In addition to water temperature increases from wastewater treatment plant discharges, thermal pollution can also occur because of construction, mining and gravel operations, urban runoff and hydrological changes. For example, the large expanses of parking lots and roofs from a shopping center can heat rain water; the first flush of this heated water can change the temperature of a stream.

Thermal pollution harms fisheries and sometimes causes a transition from cold water to warm water fisheries. It also can reduce the amount of dissolved oxygen in the stream, cause odors, increase the conditions for pathogens and bacteria growth, and encourage nuisance vegetation.

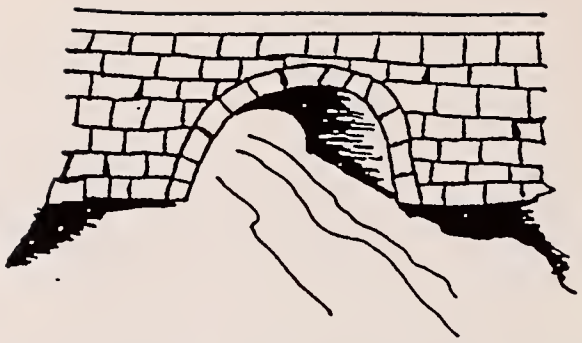
(For more information about Nonpoint Source Pollution and Best Management Practices can be found in DEPs new Mega-Manual (Massachusetts Nonpoint Source Management Manual: A Guidance Document for Massachusetts Officials) which was distributed to all cities and towns in August, 1993.) Contact your Conservation Commission to review this document.

For more information about stream protection, see the Adopt-A-Stream Workbook: How to Protect Your River, Stream or Brook, which gives step by step suggestions for community groups to use in protecting local resources.

APPENDIX C

BRIDGE CONSTRUCTION AND REVIEW PRIMER

Bridge Construction and Review Primer



Riverways Program
Department of Fisheries, Wildlife
& Environmental Law Enforcement

Between aging infrastructure and new development, bridge construction and reconstruction is fairly common. The special nature of bridge construction raises the potential for environmental impacts. This primer highlights the special nature of bridge construction, and ways to minimize environmental impacts from nonpoint source pollution. It is intended as a partial guide for designing or reviewing bridge construction work.

Never Forget the Basics

- ➡ Schedule work for the DRY SEASON.
- ➡ Limit the area of disturbed land.
- ➡ Limit the time soil is left exposed.
- ➡ Maintain Best Management Practices. (BMPs)
- ➡ Do not allow equipment maintenance in areas draining directly to the stream.

Special Considerations During Construction

Bridge construction and reconstruction is similar to any land disturbing activity. Basic environmental practices are crucial. In addition, the very nature of bridge construction and reconstruction creates unique hazards for nonpoint source pollution. Bridge construction takes place directly adjacent to and above vulnerable water resources. This leads to special and interrelated challenges.

- ➡ Potentially large quantities of water entering the site down the river, and down the road.
- ➡ A very limited amount of space for BMPs.
- ➡ Steep embankment ending at valued resources.

Flooding

The erosion control plan should address a specific design flood. Calculating a flood height is not an exact science. For this and other reasons a conservative (infrequent & high) design flood is called for. The 50 year flood is a common standard where work will continue through the wet season.

The proximity of bridge construction to streams, wetlands and flood plains make it necessary to place the traditional border of sediment fences and hay bales in the flood plain. Sediment fences must be tall enough and sturdy enough to function throughout the design flood and hay bales secured from floating away. The road surface leading to the bridge may be a significant source of runoff. There is the potential for large amounts of water to enter the construction site down that path. This makes it likely that these sediment control devices will have to filter unusually large quantities of water and sediment.

- ➡ What areas on the site plan will be covered by the design flood?
- ➡ How will BMPs in the flood plain be affected by flooding?
- ➡ Who will inspect and maintain sediment controls before, during and after storms?

Dry Work Zones

If work is to be done on bridge footings, a dry work zone under the river level is required. Dry work zones mean keeping the water away and pumping the work zone dry. Keeping the stream out of the work zone requires either a temporary dam around the work zone, squeezing the stream through the remaining space, or diverting the water to an entirely new channel. In either case the room for the river to flow will be reduced. This restriction may compound flooding problems just upstream of the bridge. In other words what might have been a minor flood before, may be a major flood during construction. The effect is localized, right where BMPs must be installed. This is another reason to design with a conservative flood in mind.

A second complication of dry work zones is the disposition of the water pumped out of the work zone. Initially this water is laden with sediment and should be pumped to a treatment area, like a settling pond, rather then directly back into the stream.

➡ Will a dry work zone be built? How?
➡ Where will water be pumped to?
➡ How were BMPs for pumped water sized?

Steep Embankments

Bridge construction sites will almost certainly have steep embankments. In addition, large quantities of water may run down the road to the construction site arriving at the top of these slopes creating the potential for severe erosion. Sound erosion control involves controlling the path and energy of runoff, and minimizing the exposure of soil to erosive forces. Special care must be taken to convey storm runoff down the vertical drop represented by the embankment. If storm sewers are already installed they are the likely path. Temporary pipes, and armored channels are other possibilities. The worst case would be for road runoff to collect and pour down an unprotected dirt embankment directly into the stream. Runoff will acquire kinetic energy descending the vertical drop representing the embankment. That energy must be dissipated both during construction and afterwards. Embankments, and any disturbed earth, including fill, should be stabilized as soon as possible.

Project plans are required to state drainage conditions before and after construction. In the case of bridges, it is prudent to plan carefully and review the drainage patterns during construction.

➡ Where and how will water descend from road level to river level?
➡ When and how will slopes be stabilized?

Work Directly Over Water

Some work, such as painting, involve the use of potentially hazardous materials directly over the water. For such work provisions should be made to intercept typical splatter and possible accidents. In no case should large quantities of paint, fuel or other chemicals be stored or transferred from one container to another where a spill will travel directly, or through the nearest storm drain, into the river.

➡ Will any sort of draping be used?

Post Construction Infrastructure

Road Runoff

Road runoff is a major source of nonpoint source contaminants throughout the Commonwealth. Because bridges last so long, their construction or reconstruction is a rare opportunity to improve the treatment of road runoff which will have a lasting effect. The methods for limiting the impacts of nonpoint source pollution have become known as Best Management Practices (BMPs). The most appropriate combination for any given site must be determined on a case by case basis considering the site itself, the amount of traffic and runoff as well as the nature of the receiving water. Generally, once the water is off the road surface the longer the time it takes to get to the stream the better. That amount of time is the only time available to clean up chemical spills resulting from accidents. Longer times imply slower water speeds and the chance for sediment to settle out. Extended contact with a rich biotic community, like a constructed wetland, allows plants to adsorb nutrients, and organisms to metabolize toxics.

➡ What BMPs will be used to treat road runoff before it enters the stream?
➡ Consult the DEP Nonpoint Source Mega-Manual.

Other Environmental Effects

Alterations in the stream bottom may form a barrier to fish and other wildlife if the stream is run through a long smooth culvert forming a long, fast, uninterrupted current. Providing eddies in the current is simple and allows upstream fish migration. On the other hand, a box covert may spread low flows into an impassable shallow sheet. Contact your regional DFW office for advice.

Bridges may be both a hazard and access point for canoeists and anglers. Will a canoe and passengers fit under the bridge? If not, is a portage path appropriate? Is it possible and appropriate to provide safe parking and access?

Bridges Last A Lifetime

Think Long Term

APPENDIX D

WETLANDS PRIMER

Wetlands Primer

I. Why should we care about wetlands?

Wetlands

- •improve water quality by cleansing our waters of nutrients and toxics;
- •serve as a buffer to protect our shorelines from storm damage;
- •prevent flooding by providing storage of floodwaters;
- •prevent erosion. The roots of wetland plants stabilize the banks;
- •provide open space for aesthetics, education and recreation;
- •provide essential habitat for many species of plants and animals, including rare and endangered species.

Wetlands are required by many types of animals and plants for survival. For many species, including the wood duck, snapping turtle, muskrat, green heron, cattail and buttonbush, wetlands are the only places they can live. For other animals, such as fish and amphibians, wetlands are critical breeding areas. Even terrestrial or upland animals frequently require wetlands to obtain food, water or cover.

Wood duck

Fish: All of Massachusetts' fish depend on wetlands either directly or indirectly since wetlands are vital to maintaining water quality and regulating stream flows. Many fish feed in wetlands or upon wetland-produced food, and/or their young use wetlands, especially riverine wetlands, as nursery grounds.

Birds: Massachusetts's wetlands are valuable resources for birds by providing year-round habitats for resident species, and breeding sites, wintering grounds and feeding areas for migratory birds, including waterfowl, and many songbirds such as marsh wrens, yellow warblers, and common yellowthroats.

Mammals: The more frequently observed wetland mammals are muskrats, beaver and eastern cottontail rabbits. White tail deer also use wetlands for food and cover.

Amphibians and reptiles: Many amphibians, frogs, toads and salamanders, as well as snakes and turtles, use wetlands for food and cover. Vernal pools (small, seasonally flooded pond-like wetlands surrounded by forests) are the only breeding sites for frogs and many salamanders.

Loss of wetlands costs public dollars. Where wetlands have been destroyed, their functions must be replaced, usually at great public expense, by manmade structures such as water and wastewater treatment plants, flood control dams and shoreline protection structures.

II. How can you identify a wetland?

Wetlands are lands that are flooded or wet at or near the ground surface for varying periods of time during the year. To a certain extent, the wet character of wetlands limits the use of the land (e.g., usually the owner can't farm without draining and can't build with out filling).

Wetlands are identified by wetland plants and by soils. When soils are flooded for a few days, the soils usually become oxygen-deficient (evidenced by the grey color below the surface). In soils frequently flooded for very long periods, peat or muck accumulate at the surface. Only plants with special adaptations can live in these soils.

…rms wet thickets called "alder swamps."

You may know where the wetlands are located from past experience or from looking at a USGS "topo" map or from a municipal map. In the field, if you walk on a wetland, you wade through water, or you feel the ground is spongy underfoot, or if it is during the dry season, you may find it dry on the surface (and wet a foot or more below.) If you are in a wetland during the dry season (usually in summer), look for clues that water is present at other times: Wetland plants have

elevated roots; dead leaves on the ground are gray or black; the "wrack line" of dead plant material shows that water has been present.

You can order copies of wetland maps from DEP's Wetlands Conservancy Program (619-292-5907) for some areas of the state. The U.S. Fish & Wildlife Service has National Wetlands Inventory maps - generalized maps of larger wetlands. Call 413-545-0359 to order.

III. What are the types of wetlands?

Vegetated wetlands may be separated into three major types: (1) wetlands and wet meadows; (2) shrub wetlands; and (3) forested wetlands.

Cattail is one of the most familiar wetland plants.

Inland:

Inland wetlands are wetlands that are not flooded by tides. The majority of the state's wetlands fall into this category - almost 500,000 acres of inland wetlands are present in Massachusetts.

Marsh: Marshes are flooded for most of the growing season. Characteristic plants include cattail, bur-reeds, sedges, blue flag irises, as well as invasive plants such as phragmites and purple loosestrife. Shrubs may be found at the edges.

Wet meadow: Wet meadows are saturated for extended periods during the growing season. Wet meadows contain grasses, sedges and rushes as well as wildflowers. Wet meadows have been used as pastures through the years.

Shrub swamp: Shrub swamps include a wide variety of wet shrubby thickets ranging from nearly permanently flooded buttonbush swamps to seasonally flooded alder swamps. Shrubs and bushes form a fairly continuous cover and may be difficult to walk through. Trees may be scattered about or in clumps. In the spring, swamps are usually covered with standing water, but as summer progresses, the surface may dry completely. A **bog** is a type of shrub swamp that forms in depressions under nutrient-poor and acidic conditions. Bogs have saturated peaty soils that are soggy year-round. Low-growing evergreen shrubs with broad leaves are characteristic species. They include leatherleaf, bog rosemary, bog laurel, and sheep laurel. Because of the lack of nutrients, insect-eating plants like pitcher-plants and sun-dews can be found here.

Reed canary grass is another common wet meadow species.

Forested wetlands: Forested wetlands - wooded swamps - can be dominated by trees that shed their leaves each fall or by evergreens. Red maple is typical of the wetter swamps.

Coastal:

Tidal wetlands are those wetlands where water levels periodically change due to the tides. About 100,000 acres of salt and brackish wetlands are found along coastal embayments and along tidally influenced rivers throughout the coastal zone. The presence of salt water severely limits the types of plants that can grow there. Some freshwater wetlands are also tidal, since the incoming tides cause a rising and lowering of both salt and fresh water. Salt/brackish marshes provide home for shellfish as well as spawning grounds for two-thirds of the state's recreational and commercial fish species. Salt marshes are among the most biologically productive habitats in the world.

For more information about wetland species see a wetland manual such as "Maine Wetlands and their Boundaries." The MA Audubon Society or the MA Association of Conservation Commissions can make recommendations about other wetland manuals.

IV. What is a healthy wetland?

A healthy wetland is a wetland that does not show signs of stress related to a significant degradation or to cumulative effects of smaller degradations.

•Healthy wetlands have a diverse and vigorously growing native plant community (with no invasive plants such as phragmites and purple loosestrife);
•Healthy wetlands demonstrate good water quality (no pollution discharges, no fill, no trash);
•Healthy wetlands have good hydrology (no alterations that restrict the flow of water into, through, or out of the wetland).

V. What degrades a wetland?

Questions on the data sheet of the Wetland Survey give a good indication of what degrades a wetland.

Vegetative degradation :
1) Exotic species: Nonnative (invasive) species replace native plant species that support existing wildlife and fish populations (examples of invasive plants include phragmites and purple loosestrife).
2) Removal of vegetation: Loss of wetland vegetation damages habitat necessary for wildlife and fish.
3) Streambank disturbance: Disturbing the streambank decreases bank stability and may increase erosion and degrade water quality.

Changes in Wetland elevations:
1) Fill: Whether clean or degraded, fill has a damaging effect on wetlands. The deposition of fill smothers existing vegetation and changes elevation and water levels. Many wetlands have been filled to the point that they no longer function as wetlands. Polluted fill obviously the wetland even further.
2) Flooding: Dead or dying trees in standing water is a sign that the water levels have changed beyond seasonal changes. Flooding may signal natural causes such as a beaver dam or human actions such as highway construction.

Hydrology changes:
1) Drainage ditches: Drainage ditches have been constructed in wetlands to lower water levels. This has been done to make wetlands suitable for growing crops or to prepare wetlands for development. In other cases, ditches have been dug for mosquito control - to drain pools of standing water that produce mosquitos. Material excavated when the ditches are made is typically deposited on the wetland as fill. This fill creates berms that may prevent water from flooding the wetland.
2) Excavation: Excavation of wetlands involves removing sand and gravel underlying wetlands or constructing ponds in wetlands. This changes the character of the area from a marsh or swamp to open water. This causes a change in fish and wildlife use and other functions. Mining sand and gravel deposits in wetlands may expose underlying aquifers. It may also expose the aquifer to surface water pollution.

Wetlands play a role in providing healthy flows for rivers. By storing excess water in times of high flow, wetlands moderate flooding. Water held by wetlands is released slowly, supplementing flow in times of drought and low flow. Poorly functioning wetlands may harm the river flow regime.

Water quality degradation
1) Stormwater discharges: The discharge of stormwater directly into wetlands may bring unwanted chemicals such as road salts and sediments (sometimes bonded with toxics) that degrade the wetland. This may lead to changes in the plant community and subsequent wildlife use. Phragmites often invades such sites.
2) Effects of pollution: Pollutants (e.g. chemicals such as fertilizers, herbicides, and pesticides) can overpower the environment and exceed the natural system's ability to assimilate, utilize or retain them. The pollutants degrade water quality in the wetland and in the rivers and estuaries downstream.

3) Erosion and sedimentation: Erosion leaves wetlands and streams clogged with sediment. This excess material changes the elevations of the wetland with possible changes in habitat for plants and animals and changes in hydrology.

Another of the important functions of wetlands is their ability to improve water quality by removing pollutants. Monitors of river water quality often report significant improvement of water quality once a stream has gone through a wetland . However, by discharging pollutants directly into the wetlands, we may overburden the natural cleansing ability of the wetlands.

VI. Remedies: Whom do you call?

Violations

Local Conservation Commission

Call the municipal Conservation Commission when there are violations of the Wetlands Protection Act. (This act regulates alteration (including dredging, filling, removal of wetland vegetation, etc.) *You must see evidence of ongoing work*. Examples of this could be bulldozers in the wetland or bulldozer tracks; recent digging in the wetland; new fill; freshly cut trees. *There must be an adverse impact to the wetland* for the Commission to act. The Commission has the power to place an enforcement order which requires the work to stop. They have additional powers to require the proponent to restore the wetland.

Local Board of Health: Call if you detect a sewage smell in the stream and/or if the water looks cloudy.

In addition to calling, a follow-up letter should be sent reporting the action and asking for a response on the action taken.

Restoration

Wetland Restoration and Banking Program (WRBP)

Wetland Restoration and Banking Program (WRBP): WRBP implements a program for proactive (voluntary) wetlands restoration initiative called "GROWetlands" (Groups Restoring Our Wetlands). Created in 1993, WRBP is looking for degraded and destroyed wetlands to restore where there is no obvious current violation wetland law. WRBP seeks GROWetlands sponsors (civic groups, town governments, business groups, etc.) for wetlands restoration projects. The wetland may be filled with sediment, or barren, or may have been ditched for drainage, or may be dominated by phragmites. WRBP can help you evaluate the condition of the wetland and determine whether the wetland is a candidate for restoration. If it is, WRBP can help you get started. Getting the cooperation of the landowner is an important first step!

GROWetlands sponsors receive technical assistance and help securing project funding from WRBP and, in return, they agree to use the project to provide public education and essential data about the project. WRBP coordinates the Partnership To Restore Massachusetts Wetlands, an alliance of government and private groups, businesses, and individuals who work together to support GROWetlands projects. Many of these groups have funding programs for restoration projects.

For more information get in touch with the WRBP:

- Wetlands Restoration & Banking Program, Executive Office of Environmental Affairs, 100 Cambridge Street, Boston MA 02202;
- 617-727-9800 X 213
- 617-727-5696 Fax
- Email: cfoote-smith@state.ma.us

APPENDIX E

REPORTING GUIDE FOR EFFECTIVE RIVER WATCHING

REPORTING GUIDE FOR EFFECTIVE RIVER WATCHING

Members of the various watershed associations and Adopt-A-Stream Groups can be effective protectors of the many streams and rivers in our state.

Observation	Problem	Action
Crashed tanker truck leaking fluids into a stream	May be toxic materials	Call State Police (look for chemical number red diamond on truck). Call Hazardous Waste Hotline (1-800-424-8802).
New fill material on stream bank or wetland	Destruction of habitat	Call local Conservation Commission
Newly cleared land near stream or wetland	Destruction of habitat, runoff and sedimentation into stream	Call local Conservation Commission
Many (> 10) dead fish	Kill from toxics or changes in natural conditions.	Investigate extent, number and species of kill. Are fish dying or decaying? Call Fisheries & Wildlife at Westboro (508- 792-7270) and District Offices.
Oil Slick	Water pollution	Call Hazardous Waste Hotline at 1-800-424-8802, Coast Guard, or local fire department or Board of Health.
Blockage in fishway or stream, low or no water in fish ladder	Barrier to migrating fish	If marine species, call Division of Marine Fisheries (508-888-3590 on South Shore; (508-745-3107 on North Shore). If inland fisheries, call Fisheries & Wildlife, (508-792-7270).
Sediment Bars or Silt deposits	Degradation of Habitat	Investigate possible source of pollution. Call local Conservation Commission or work with local DPW. If from a state road, call MA Highway Department (617-973-7002)
Milky water/solvent odor	Sewage pollution	Call local Board of Health or Department of Environmental Protection (617-292-5500) to get regional office numbers.
Trash or litter	Illegal dumping	Organize River cleanup. If witness dumping, call Environmental Law Enforcement hotline (1-800-632-8075).
Large areas of green algae	Nutrient overload	Investigate extent. Call local Conservation Commission.
Eroded Stream banks	Lack of buffer strip; excessive development in watershed.	Investigate extent. Call local Conservation Commission.

APPENDIX F

RIVER AND WATERSHED CONTACTS

RIVER AND WATERSHED CONTACTS

River or brook name:_____ Watershed: _____

Contact Person:_____; Address:_____:
Tel. No._____ Date:_____

LOCAL ENVIRONMENTAL GROUPS (include watershed association): Name and telephone number:

_____
_____
_____

HUNTING/FISHING ASSOCIATIONS Name and telephone number:

_____
_____

LAND TRUST: Name and telephone number:

_____

LOCAL OFFICIALS: (names and phone numbers of board chairmen or interested member)
Selectmen/City Council_____
Conservation Commission_____
Planning Board_____
Board of Health_____
Department of Public Works_____
Recreation and Parks_____
Economic Development_____

LEGISLATORS Names and phone numbers:
MA Representative(s)_____

_____
MA Senator_____

US Representative_____
US Senators_____

_____

PRESS (newspapers/radio stations/local cable television stations): names and phone numbers:

_____
_____
_____

STATE and FEDERAL AGENCIES (add contact person's names as you meet them)
Department of Fisheries, Wildlife & Environmental Law Enforcement
-Riverways/Adopt-A-Stream Program, (617) 727-1614 x 384_____
-Division of F&W Field Headquarters (508) 792-7270_____
-Centrai Wildlife District (508) 835-3607_____
-Conn.Valley Wildlife District (413) 323-7632_____
-Western Wildlife District (413) 447-9789_____
-Northeast Wildlife District (508) 263-4347_____
-Southeast Wildlife District (508) 759-3406_____
Department of Environmental Protection
-Office of Watershed Management (508) 792-7470_____
-Northeast Region (617) 935-2160_____
-Southeast Region (508) 946-2759_____
-Central Region (508) 792-7650_____
-Western Region (413) 784-1100_____
U.S. Department of Agriculture
Community Assistance Partnership, Natural Resources Conservation Services: (508) 295-7962

_____
Environmental Protection Agency
Water Management (617) 565-3478_____

APPENDIX G

SHORELINE SURVEY REPORT AND COMPLAINTS FORM

SHORELINE SURVEY REPORT AND COMPLAINTS FORM

SHORELINE SURVEY
REPORT AND COMPLAINTS FORM

Date problem seen: _____ *19* _____
Date problem reported: _____ *19* _____
Problem reported by phone, letter, visit, other: _____
Reported by: _____ *Tel.* _____
Address: _____

Location of problem:

_____
_____

Description of problem:

_____
_____
_____

Complaint made to: (Name and position)

_____
_____

Copies sent to: _____ *Date:* _____

Advice given by official about problem:

_____
_____

Action Taken: (circle) Yes No

Board or official: _____
Date: _____
Town: _____
Description of action taken: _____
_____
_____
_____

Was the problem solved: Yes No: Describe and explain why or why not:

_____
_____
_____

Is future action needed by Stream Group? If yes, what?

_____
_____
_____

Adapted from the Westport River Watershed Alliance Call and Complaints Form

APPENDIX H

STREAM CLEAN UP INFORMATION SHEETS

Stream Clean-up Information Sheets

Clean-ups along rivers and streams can be an important follow up to Shoreline Surveys. Some clean-up will have the immediate result of making the rivers more attractive for anglers, canoeists, walkers, and landowners. Clean-ups may accelerate the natural restoration processes of new vegetation along the stream banks. We ask that you leave the river and its banks in a natural state giving careful consideration to the following:

Conservation Commissions:

- In order to protect the wetlands, streams and banks, the Wetlands Protection Act (and in some cases local wetland bylaws) give Conservation Commissions jurisdiction over any activity that takes place in the wetlands and within 100 feet of wetlands and streams. Consult with them and show them where you plan to clean up. You will need their permission for removal of trees, logs, and vegetation in these critical areas. To make an appointment to discuss these issues with the Commission, call Town or City Hall and ask to speak to the Commission administrator or to a Commission member. **Enclosed is a form which you can fill out and give to the Commission.** Find out if you need to make formal application.

Property rights:

- Before crossing over or cleaning privately owned lands be sure to get permission from the landowner.

Protection of the river:

- Because the river's natural flow needs to be protected, and because streams naturally change their direction, avoid trying to steer them or contain them within the confines of a certain area by barriers.

- Use cutting and clearing equipment in such a way as to avoid and minimize streambank erosion.

- Direct volunteers to avoid trampling the stream bank where the growth of young or fragile plants prevents bank erosion.

Wildlife/habitat:

- Remember the trees and shrubs adjacent to a stream provide shade which helps keep streams at temperatures below 70 degrees so that they will provide healthy habitat for fish and discourage the growth of algae.

- Branches and logs in streams provide protection for fish and small animals. It is important to maintain a certain percentage of shade cover from nearby trees over a stream bed as well as to leave some logs in streams to provide protection for fish and small animals.

- Small wildlife and birds use brush and ground vegetation for habitat and foraging. Remove only the amount absolutely necessary for your purpose (fishing, walking and canoe access.)

- Instream work in streams used by migrating alewives should be done during July and August. This is to avoid the spawning and migrating season. It is best to do instream work when flows are at their annual low.

continues

STREAM CLEAN-UP TIPS

Before you start your clean-up talk to your group about what can be done and what can not be done according to your clean-up project plans and the comments of the Conservation Commission.

Remember that a clean-up should benefit the river and leave it in a healthy natural state. It is not just to make it nicer for the people using the river.

Follow common sense safety rules and keep in mind the following suggestions.

* Always work with in pairs or with a team captain.

* All children must have adult supervision.

* Do not put yourself in danger. The stream bed can be very slippery an uneven, sometimes at unpredictable places and times. Move slowly.

* Watch for sharp objects submerged in the stream bed and on the banks, nails in old planks or logs.

* Do not attempt to walk across streams that are swift and above knee in depth. These can be dangerous.

* Be alert for spawning areas and shell fish beds; do not disturb or walk on them.

* Watch for poison ivy and brambles, ticks, nettles, and insects. Bring repellant; wear long pants and boots.

* Consider landowners rights. Try to get the permission of landowners to cross private property, posted or not. Do not enter posted areas without permission. Take advantage of public access points.

* Persons using canoes must wear personal safety flotation devices and keep clear of volunteers on foot.

* Chain saws must only be used by owners and when other methods are inadequate. Others should stay clear of the area when chain saws are in use.

* Be sure to review your clean up plan with the Conservation Commission.

IF FOR ANY REASON YOU FEEL UNCOMFORTABLE ABOUT THE STREAM CONDITIONS OR SURROUNDINGS, PLEASE STOP YOUR CLEANUP. YOU AND YOUR SAFETY ARE MUCH MORE VALUABLE THAN ANY OF THE OBJECTIVES OF THE CLEAN-UP.

(These safety tips come from the Town River Clean-Up Committee of the Taunton River Watershed Alliance and EPA Region 10 Streamwalk.)

continues

Stream Clean-ups

Because Conservation Commission have jurisdiction over work done within 100 feet of stream banks and wetlands, talk with your Commission before beginning your work. Fill out this worksheet before you talk with them.

Conservation Commission Worksheet for

A RIVER CLEAN-UP FOR THE _____RIVER

Proposed by (group)_____

Proposed work date(s) _____
rain date (s)_____

Date of approval by Conservation Commission_____

Groups' contact persons' names, address and tel.no:

_____

_____

_____

1. **What is the purpose of your clean-up?** (access to river, canoe access, canoe passage through river, fishing access, habitat improvement) Describe:

Is the work you propose going to be? (you may need to determine this as you talk with the Commission members)
___on the bank itself
___on the stream bottom
___in a wetland
___in the buffer zone (within 100' of stream or wetlands)

Does the work include?
___removing man made litter for scenic improvement
___removing brush for walking or canoe access: describe amount and type of vegetation to be removed.
___clearing the stream for canoe passage: will logs be left for fisheries and wildlife habitat? What is the minimum the group can remove and still allow canoe passage?
___clearing the bottom of the stream of man-made trash?
___other, describe:

continues...

2. Define Where you are going to work.
2.Show the Commission on a map and describe the area as best you can. (Along the banks of the X river, between X street and Y bridge, from the bank to about 50 feet from the river.)

3. **What tools do you plan to use?**
____hand-held tools only
____power tools
____bobcats? trucks?
____other, describe?

4. **How will you dispose of the trash collected?**

5. **What measures are you going to use to protect the natural resources: e.g. banks from eroding, silt from going into the stream, wetland damage.** (This also may be determined in conjunction with the Commission.) Examples: leave vegetation on the banks, not cut the wetland vegetation, leave brush on the ground, leave enough logs on the stream for pooling and shelter for fisheries.

6. **Do you have written permission from the landowner(s)?**_____
Name(s) of owners

_____

_____

7. **Conservation Commission Guidelines:**

It is the responsibility of the applicants to inform the clean-up volunteers of the scope of the work to be done and the guidelines of the Conservation Commission.

Spring, 1994

APPENDIX I

EOEA/DEP WATERSHED SCHEDULE

RIVERWAYS
Newsletter Spring 1996

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Department of Fisheries, Wildlife & Environmental Law Enforcement, John C. Phillips, *Commissioner*
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Implementing the Watershed Approach Through Basin Teams

By Andrew Gottlieb, Director, DEP Office of Watershed Management

The Office of Watershed Management in the Department of Environmental Protection has established watershed teams for the twenty-seven river basins and drainage areas in Massachusetts. These teams have been established in order to implement OWM's watershed-based resource assessment, surface water permitting, and non-point source pollution control programs. By working in teams, staff are able to pool their knowledge and skills. These teams were built on the premise that the synergy created by pooling individual areas of expertise and the mutual support gained by group members produces energy and creativity that greatly exceeds the sum of its parts.

The watershed approach to resource management is the centerpiece of the Department's "Clean Water Strategy," and as such, the river basin has been designated as the fundamental planning unit upon which the integrated water resource management activities of the OWM watershed teams are based.

In fact, this model is the foundation upon which the OWM was created, allowing the Department to synchronize five functions according to a watershed-oriented regimen that had previously been performed in isolation. These are: water resources monitoring and assessment, water withdrawal permitting, nonpoint source pollution control, awarding of water quality related grants, and wastewater permitting under the National Pollutant Discharge Elimination System (NPDES).

By coordinating these programs, and focusing their activities in a particular watershed, the relationship between water quality and water quantity, and point and non-point source pollution is better understood.

A 5-year phased program of watershed-based assessment, permitting, and non-point source pollution control has been adopted by the OWM. During the first year and continuing throughout the 5-year cycle, input from outside agencies and the general public is actively solicited by the team in order to gain further insight into water quality and quantity goals and use-objectives for Massachusetts surface and ground waters. In addition, outreach by the team helps to build partnerships for protecting these waters as the focus of water pollution abatement continues to shift to non-point source control measures.

Water resources surveys are carried out by the watershed teams in the second year. The scope of the field assessments varies depending upon the resources available and the important water resource issues within each watershed and may include analysis of water chemistry, macroinvertebrates, sediment, flow and fish tissue.

Resource assessment information, including, where applicable, the determination of site-specific water quality criteria, calculation of total maximum daily loads (TMDL), and the derivation of load/wasteload allocations and instream flow requirements are completed during the third year, a year prior to permit issuance. The Department is developing a GIS based computer model which will provide predictions regarding changes in water quality under different pollution abatement scenarios to enable managers to target efforts which promise the greatest environmental and economic return.

The fourth year involves developing watershed management recommendations based on the resource assessment and meeting with the wastewater discharge and water withdrawal permittees and issuing final permits. In addition, this phase includes the targeting of priority waterbodies exhibiting non-point source pollution problems for the implementation of Best Management Practices (BMP) or other control strategies. Implementation will be realized, in part, by the awarding of Non-Point Source Pollution competitive grants in accordance with the requirements of Section 319 of the Clean Water Act.

The successful completion of each of the phases described above for a particular watershed is now the responsibility of the respective watershed team and will be evaluated in the fifth and final year of the 5-year cycle.

[Ed. note. Through the Watershed Initiative, all EOEA agencies have members on the Basin Teams originally created by DEP. Watersheds benefit by the broad knowledge of agency staff with different mandates and areas of expertise. In addition, watershed associations, Conservation Districts, and other groups and agencies are members of several of these teams.]

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EOEA/DEP WATERSHED SCHEDULE

Schedule and Team Approach to watershed based Assessment and Permitting. To implement watershed-based assessment and permitting, EOEA/DEP has organized teams with water supply, water quality assessment, wastewater and nonpoint source pollution control expertise to perform outreach, field reconnaissance and survey, permitting, and management activities. The following schedule has been drafted for the 28 river basins in Massachusetts.

Years	***Watershed***	***Team Leader***	
1993-5	*Blackstone* *Chicopee* *Nashua* *Connecticut*	*Elaine Hartman (DEP)* *William Pula (MDC)* *Pat Austin (MDC)*	*508-792-7470* *413-784-1249* *617-727-5274 X 280*
1994-6	*French and Quinnebaug* *Merrimack* *Boston Harbor (Neponset/Mystic/Weymouth-Fore River)* *Parker* *Cape Cod* *Narragansett*	*Gerald Szal (DEP)* *Brian Friedmann (DEP)* *Jane Mead (CZM)/* *Laurie Kennedy (DEP)* *Joan Beskenis (DEP)* *Christine Gault (DEM)* *Gary Bogue (DEP)*	*508-792-7470* *508-792-7470* *617-727-9530 X 418/* *508-792-7470* *508-792-7470* *617-727-6174* *508-792-7470*
1995-7	*Buzzards Bay* *Deerfield* *Ipswich* *Islands* *Millers* *Shawsheen*	*Dave Janik (CZM)* *Gary Bogue (DEP)* *Duane LeVangie (DEP)* *Greg Skomal (DMF/DFWELE)* *Bob Kubit (DEP)* *Bill Dunn (DEP)*	*508-946-8990* *508-792-7470* *617-292-5706* *508-693-0060* *508-792-7470* *508-792-7470*
1996-8	*Farmington* *South Coastal* *SuAsCo* *Taunton* *Westfield*	*Karen Nelson (DEM)* *Sarah Crocket (DEP)* *Eben Chesebrough (DEP)* *Kathleen Keohane/* *John Post (DFWELE)* *Mike Parker (DEM)*	*617-727-3267 X 598* *508-792-7470* *508-792-7470* *508-792-7470/* *508-759-3406* *413-545-5993*
1997-9	*Charles* *Hoosic* *Housatonic* *North Coastal* *Ten Mile*	*Beth McCann (DEP)* *Elaine Hartman (DEP)* *Leslie O'Shea (DEP)* *Lawrence Gil (DEP)* *Nancy Phillips*	*508-792-7470* *508-792-7470* *508-792-7470* *508-792-7470* *617-727-3260 X 696*

For more information on EOEA/DEP Team work or to learn how best to share the results of your Shoreline Survey, call your Team Leader. *Team leaders are subject to change. For additional and updated information, call Renee DeShazo at DEP, 617-292-5929.*

APPENDIX J

STEPS IN JOINING THE ADOPT-A-STREAM PROGRAM

Steps to Joining the Adopt-A-Stream Program

HOW TO JOIN THE ADOPT A STREAM PROGRAM

Do you have a raging river of pollution going through your town, or fishing spot on a river that seems lacking in the usual abundance of fish species, or a stream that you fear will be changed drastically from its quiet meanderings by a nearby proposed development, or a favorite stretch of stream or river that has always been a place for quiet reflection?

The **Adopt-A-Stream Program** of the Department of Fisheries, Wildlife and Environmental Law Enforcement can provide help to interested citizens who want to take action to preserve or improve the quality of the river or stream nearby and its supportive ecosystem.

These steps outline how you can Adopt-A-Stream:

1. Contact the Adopt-A-Stream (AAS) Coordinator, Riverways Programs, Department of Fisheries & Wildlife, 100 Cambridge Street, Room 1901, Boston, MA 02202, (617) 727-1614 X 384.

2. Fill out the forms contained in the Adopt-A-Stream Workbook requesting information about your stream, your organization and your concerns. Be sure to fill out the form describing your issues and needs. (See pg. 39.)

3. Call the AAS Coordinator to discuss your concerns and ways to work together.

4. Schedule an on-site visit for us and/or a meeting with key people in your organization. As appropriate, we will arrange for fish and wildlife biologists, water quality specialists, or land management experts to evaluate the condition of your stream and its banks.

5. Develop a preliminary action plan to address river issues using us as consultants as needed. Work with AAS staff to develop a scope of agreement which describes your action plan for addressing river issues.

6. Determine with the AAS staff what level and type of service you can best use and who can best provide assistance to implement your action plan.

7. Receive Adopt-A-Stream designation and use Riverways support for an action plan, for citizen education or for organizational activities. Organize a time, place and event to receive your AAS certificate. Invite the press, local officials, other environmental and civic groups, the local watershed association and state representatives and senators to the event. We will make the presentation and help you celebrate the adoption.

It may be that you do not have an organization and need help getting started. Or it may be that some other state agency should also be involved in helping you. Our goal is to work with you to understand each situation and find the method of stream and ecosystem protection most likely to be successful. Call us.

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Adopt-A-Stream Program

Issues of Greatest Concern

Number 1 to 11 in order of concern to your group, with 1 being the most important.

____Point source pollution (wastewater treatment plants, industries, etc.)

____Non-point source pollution (agricultural runoff, erosion, urban runoff, septage systems, etc.)

____Erosion of banks

____Riverfront land acquisition, conservation easements

____Wildlife habitat and management

____Fisheries habitat and management

____Open Space/recreation/access

____Local regulations or bylaw protection of water and open space resources

____Public information and education about watershed resource issues

____Water supply or conservation

____River diversion

____Other (please describe)_____
_____.

Greatest Organizational Needs

_____Understanding state or federal government systems related to water supply and rivers

_____Understanding local government options for protecting waterways

_____Mapping land uses/ownership/habitat/water resource areas, etc.

_____Use of media

_____Running good meetings and a strong organization

_____Educating the public; involving the public

_____Finding funds

_____Other (specify)_____

What specific projects do you have in mind for protecting the stream or river you want to adopt?_____
_____
_____